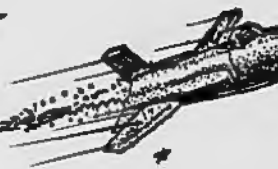
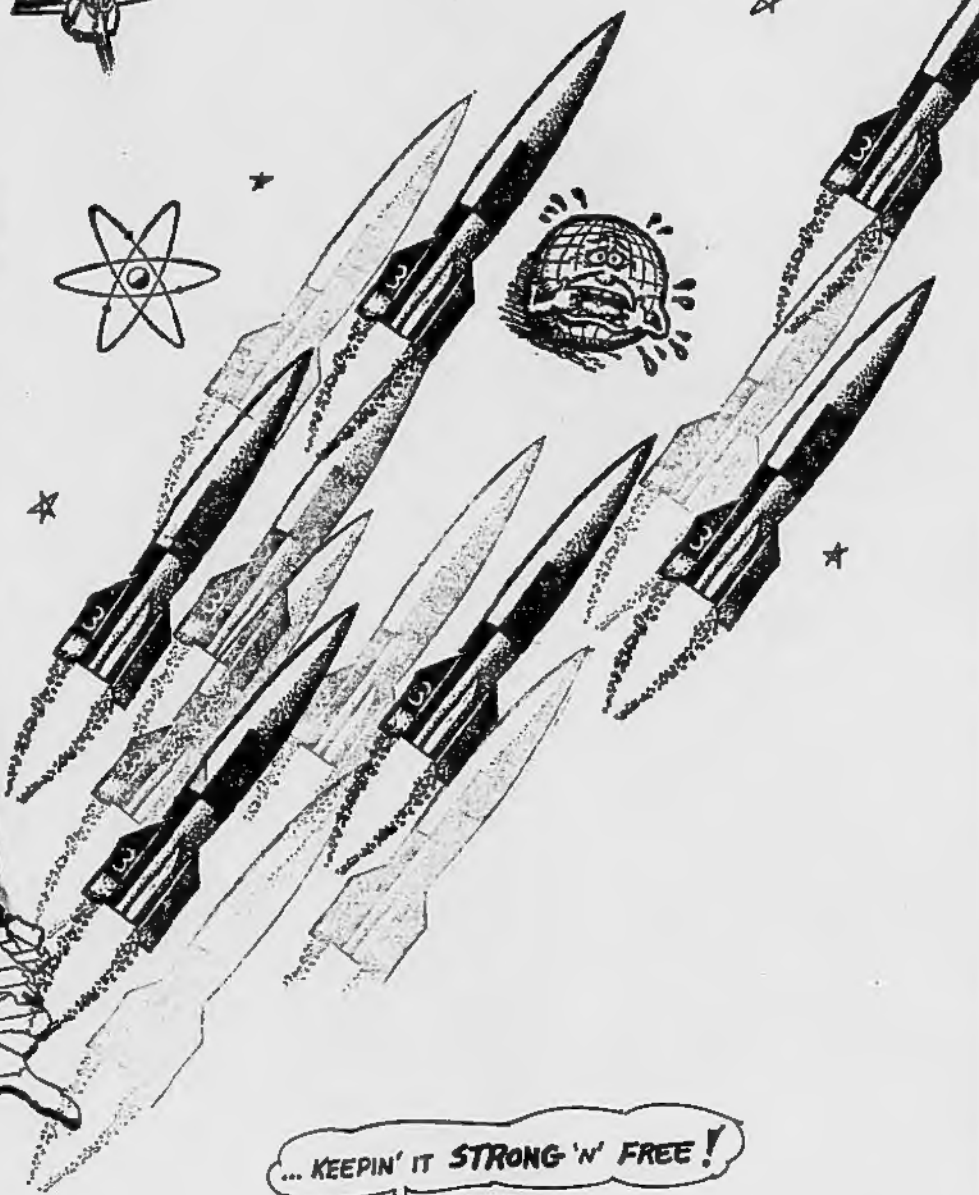


**\$PACE** ★



HEY THERE!



... KEEPIN' IT **STRONG 'N' FREE!**





The Amateur Press Association  
by and for  
the members of General Technics  
(so it is said)

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Γ  
Δ G.T. Buckfast (Editor): Donna Proni, 530 W. Walnut St., Kalamazoo, Φ  
Θ Mich. 49007 (616)-342-4967 Ψ  
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page count:	45

Additions to APA-TECH 44:

Transporter Topics #39 / Rod Smith	3
total:	49

The deadline for APA-TECH 46 is Monday, December 1, 1986 in Kalamazoo.

The copy count is 30; minimal activity is two pages every four months (an' we mean business!).

I have no financial information this month; if you owe money, GTB will be after you...

Members happily added: Lee Hart

Members ruthlessly dropped: Dick Smith

The dreaded Imminent Peril List: John, Cap'n Al, Andy, Hugh, Tullio, Kiran  
(you have until January 1st, guys!)

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\* \* \*

About the time I was going to collate this issue, the roof fell in, as it does from time to time. I don't like sending the APA out so late, but there really were somewhat more important things to take care of. If you feel this is really lousing up the distribution, let me know; if enough people complain, maybe I'll go back to filling-in on the bimonthly system. My apologies.

The experiment does seem to be helping things, though. I'd like to welcome Lee Hart to APA-TECH in this issue and welcome back Bill Leininger in last month's. It looks like we're averaging forty to fifty pages a month, which will put the annual page count somewhere over 500. Some of the members who haven't been heard from in a while are popping back in, so I hope the system of twelve opportunities a year will continue.

I support the enforcement of the minac rule come January 1st, since we are finding the need to turn-over members. I'll be editing then, so if the Imperiled Parties don't turn up in the next issue, they won't be getting #47. We'd hate to lose you folks, but you've had four months' warning... I will continue to run the roster in my issues, since I like having everyone's current addresses and phone numbers handy, instead of having to dig through my filing cabinet.

It saves me some time getting this out if I don't have to do the cover. It's not that I dislike doing APA-TECH covers, but there are occasions when I really won't have the extra time to hack one out. (This one, which doesn't exist yet, will be hacked out...) The preceding is known in technical parlance as a "thinly veiled hint."

I bought a new Acco No. 131 Heavy-duty Stapler, which looks like it could drive fasteners through battle-rocket armor. I am **not** charging its purchase against APA-TECH accounts. However, I will not decline any donations you may wish to forward. The preceding is known as a "shameless and obnoxious solicitation." I'm sorry I brought it up... pay me no mind...

Righto, GTB will be pleased to receive your 'zines for the next issue. Have a swell Thanksgiving!

Shal.





Sheila Groves  
335 Sagamore Dr.  
Rochester, N.Y. 14617

\*\*\*\* AT HOME ON THE RANGE \*\*\*\*

ALL ORIGINAL  
SPELLINGS signify  
ORIGINALITY, LACK  
OF A WORD PROCESSOR  
AND SHOULD ADD TO  
THE UNIQUE QUALITY

ALIVE AND WELL...Hello to all !

World Con was fun, however the people at DISCOVER Card keep charging me the Hilton bill each month I must have offended some automatic billing gohd. It's adding up!

The highlight of the Con for me was sneaking into the S.F.W.A. party to hob nob with my betters....discussing the fine points of possession with a writer who was surprised to discover that I knew the differences between a succubi and an incubi..."it was dark and there were a lot of them..." Look for my forthcoming short story: Nine-tenths Of The Law.

At Home On The Range: In a nutshell, I work, sleep, and shoot. Im not sure if shooting three times a week falls into the catagory of mundane...perhaps I've drifted into another fringe culture. Paul (my significant other) ((however his significant other is a custom 45))..... who I have been seeing now for 13 months--YES OVER ONE YEAR--is a devote mundane in all other respects.

Other women recieve flowers or sparklies as tokens of affection, last week paul gave me a 20 gage pump shot gun...so you know were serious.

Un'ca Bear (John Hall) informs me that i missed a great Conclave...sigh...I wish to see Teddy Ruxpin and Grubby doing point counter piont....

Mr. Hall has asked me to accompany him to ISHER CON to which I agreed, looking forward to it. Yes, Proni's Im coming--by the way--what's the weapons polacy this year?

Alice Bentley's prophessy comes to pass--OR Life in the swamp when the eco-system crashes... TROPEL LAID CFF 42 people last week...after the angel of death drifted over, I found myself still employed... but for how long? GCA heads for chapter 11.

Alice and Mike escaped before the city decided to reconstruct the infamous "Can Of Worms" traffic snarl... you thought Rochester did not have traffic jams..Ha!

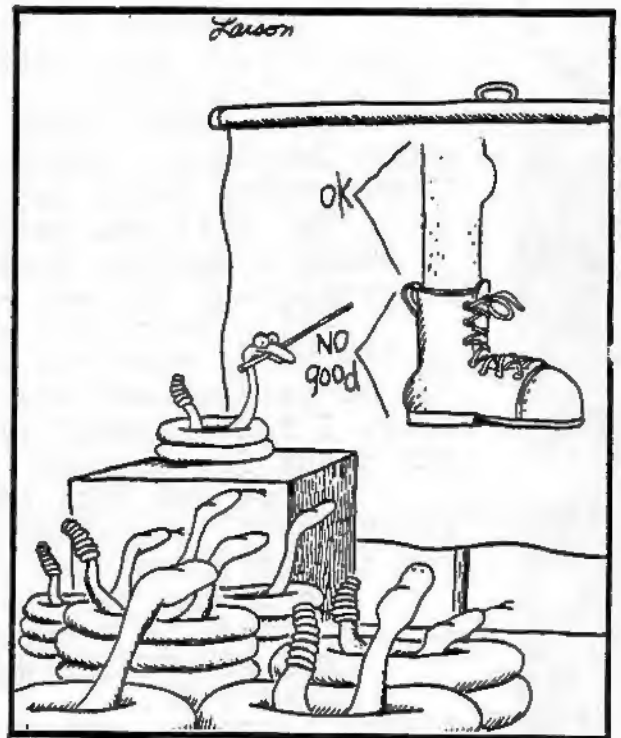
On a more personal note: If Im going to be 29 soon, why do I feel 18 ? oooooo-very scary.

PBS NEW SERIES WHAT WE ARE great ,wonderful, don't miss THAT'S IT.

LIFE'S A BITCH, THEN YOU REINCARNATE.

Love, *Sheila*

OF THE GARMENT - ER, APA.





OVER (T)HERE.....

A zine for APA TECH by  
Linda Struwe Matsushita  
coming to you from  
2 - 15 - 1 Kosobe #302  
Takatsuki, Osaka 569  
Japan

Living in a foreign country can be exciting, educational, and a downright pain in the ass. These (and similar) feelings tend to flow in waves. First there's adjustment - when your senses are so bombarded with the new and unusual that everything seems to happen in a daze. Then you might move over into awe - of the people and the country. A while later, so entranced you wonder why everyone isn't living here. Then you realize that everyone is living here and it's darn crowded. Perhaps here begins the jaded indifference, and from there it's an easy slide into outright contempt. As I said, any and all feelings come and go, with period and frequency variable. My moods generally change with the wind anyway, so I can go through the whole spectrum on any given day. The most trivial things can institute a change in mood. Just asking a simple question (like 'where's the station'), getting an answer, and actually understanding the answer can leave you walking on air. Conversely, a ride on the subway with the morning rush hour crowd usually leads me to start mental diagrams for a portable, personal force field generator. In the movies it looks like all those people are well ordered and moving smoothly together. Sure, when you're above the crowd. But when you have to move through the trenches with them it's every man for himself.

I suppose the biggest problem with living in this "homogeneous" country is that one can't help but stand out as a gaijin (generally translated as 'foreigner', it also means 'outsider'. And the implicit meaning is 'not Japanese'). 24 hours a day every day you're on stage - an open target for anyone to practice their English on or be looked over so they can convince themselves that the Japanese are truly a breed apart. I sometimes feel like the specimen at a zoology demonstration. One of the tragedies of the culture is that no matter how long you are here, how fluent in the language, or how culturally adapted you are, you will never be accepted in the group as one-of-us. Always destined to be a them - a gaijin. No, you can't even marry into the group. In fact, the usual outcome of an international union is for the "japanese-ness" of the person to fall under suspicion for marrying outside the group.

I'd like to think that I am fairly well adjusted to living here (and in general). One of the things I do miss is American food. Food truly defines a way of life. If I had seen 2010 three years ago, (prior to living overseas) I would have thought the scene between Floyd and Haywood discussing hot dogs and mustard to be inane and totally unrealistic. Someone who has traveled a lot must have been on the consulting staff. It's been my experience that expatriots (especially those who plan to return soon) do reminisce on foods gone by.

What's a baseball game without a hot dog? Here you get squid

on a stick. How can you enjoy a movie without hot buttered popcorn from the lobby? And I don't know how the college kids get through four years without pizza deliveries. Regarding the bean paste in the donuts - strange as it may seem a great many people here actually like the stuff. They'll put it in almost anything - from donuts to ice cream to soup. To me it's sickly sweet unless mixed with something very neutral as it is in the soup. Most notably missing from the supermarket shelves are the ingredients for a good weekend cookout -- ribs, bar-b-q sauce, thick steaks, sausages, pickles, marshmallows,..... you get the idea.

The culinary deficiencies tend to stand out particularly well on holidays. Sushi for Thanksgiving just doesn't inspire me. New Year seems to be the only Japanese holiday that has special food associated with it. These dishes can be quite elaborate, and many of the women I know begin preparations a week or more in advance. And there are a lot of preparations to make since the New Year is celebrated over a three-day period. This is much different from an Isher party, though. Things here are very quiet and solemn, with visits to family, friends, and of course the local shrine.

I do not mean to imply that there is a great void of foreign food products. On the contrary, at least 75% of the things available "back home" (be it America or Europe or Asia) can be found here. Sometimes it's a matter of actually finding what you want, sometimes it's a matter of cost, but a lot is available. In the larger cities (none of which I am conveniently near to now) there are small ethnic shops catering to specialized foods from all over the world. If you want something badly enough, anything can be had.

And now for some answers to questions and my 2 yen worth.

English as a second language, or anything as a second language, can produce some comical results. Direct translations usually turn out to be wrong. English has so many exceptions that some students feel it's easier to just make up your own rules. A thesaurus is one of the most dangerous things to give a student. (One of my favorite signs is above a pet shop that advertises "fondle dogs".) Any given piece of English usage will almost certainly have at least one thing wrong with it -- spelling, grammar or meaning. Even quotes or bits of poetry usually don't appear correctly. And there's a lot of opportunity for mistakes. English is the snob language. You need it for college, for the semi-required student trip overseas, for the big company jobs, and maybe a little bit for the blitz Hollywood has launched. T-shirts, dishes, school bags - anything with writing space has a dash of English on it. I'd venture to say that 99% of the time the person bearing an English phrase has no idea what it means. So you get big beefy guys wearing shirts that say "I like sailors. Let's play yacht." French is the popular language for bakeries and elegant dining establishments. There are just as many errors in their French as in their English usage.

But not quite all of the 'errors' you may see are actually errors. I've been forced to learn a bit about my own language in try-

ing to tell other people about it. Why we say this, when we say that. Some of the language depends on where you are from, since there are several dialects in English and all are equally valid. All Americans know about the 'Ha-vad' speech in Boston, or the Scarlet O'Hara syndrome in the South, but I think most people tend to discount the fact that English is the native language in some other countries as well, and that they have their own dialects. For those of you who own Japanese electronic equipment and have been instructed to 'earth' your appliance -- this is not so shocking (sorry) once you realize that the writer is using a British English dictionary and not an American one.

The naming of names.

Donna has mentioned that I have never mentioned my husband's name. He does in fact have one -- to wit -- Yasushi. Said just as it is written, in 3 syllables. Japanese is a phonetic language. When among English speakers he generally goes by 'Yas' -- sounds like not mass.

The mark at the end of my last zine (#42) and this one is called a han stamp and in the original it is red. The two characters are the kanji form for my/our last name. 松 being matsu (pine tree) and 下 being shita (under or below). The han stamp is used instead of a signature. Each head of family must have a registered stamp which must also be unique. The registered stamp is usually very stylized and it is used for all banking, real estate and such like transactions. The plain stamps, such as the one I used, is used for "signing" receipts such as bill collectors or package deliveries.

So why the heck am I here?

Once upon a time, in a land far away..... Chicago, 1975 ..... I met my husband-to-be. Love at first sight? No. High school sweethearts?? Well, no. In fact, I don't even remember it happening. But Yas does and I'm willing to take his word for it.

You see, Yas knew one Alex Ellingsen through computer class, and I knew Alex through fandom. One morning before school I was sitting with Alex and a few other neo-fen. Yas happened to be around, saw Alex, and came over to discuss matters deep and dark. Here is where we (supposedly) met. And that was the last I saw of Yas until August of 1978 -- new student week at the U of I Urbana.

It came about that several people from Lane Tech H.S. landed in the same dormitory and the same college (Engineering). Out of an intense fear of the vastly unknown, we tended to gravitate together while readjustment to surroundings took place. So I again met up with Yas.

After a year and a half of developing close friendship, we started out on the rough and rocky course of courtship. This involved some unusual problems. Not the least of which is that his mother had expressly forbidden him to marry an American. She wanted a nice Japanese girl for her only son. I guess mother-in-laws are about the same the world over. Also, as a foreign student Yas could remain in the U.S. only as long as he was a student. Upon graduation he had to return to his place of origin...in this case, Japan. Taking the

long way through, I had another year to go before graduating. So we faced the bleak prospect of a minimum of a year's separation. Builds character, right?

During the winter break of my last year (1982/83) I came to Japan to meet the prospective in-laws. This wasn't just formality. It never came down to Yas having to choose between me or his family, but if it had, I'm not confident of what the result would have been. However, the family approved so now our only major problem was living in different hemispheres.

When I graduated the next spring, we were now faced with major decisions. This is a thing that Yas, the little dear, avoids like the plague. He was not ready for marriage, and I was not ready to leave home and hearth. With the certain knowledge that I would be leaving the States soon (whenever that is), I decided not to get an engineering job. I didn't feel it was right to take a position for 6 months or so and then leave. This is one of the few decisions in life I regret. Engineering is my first true love and I'm afraid I will never be able to get back into it. I've forgotten quite a bit through lack of use, and I've had no real work experience. Returning to school is a possibility, but that will depend on a variety of variables when we do finally return to the States.

Yas was scheduled for a 6 month assignment in Burlington, VT. beginning May of '84. So theoretically I would join him then and if all went well go back to Japan with him. If you were paying attention last time, you'll remember that all did not go well. His assignment was repeatedly delayed until finally he arrived in September for 6 weeks. I managed to see him one weekend of that time, and still no final solution was arrived at.

Having grown tired of paying phone bills that looked like the down payment on a house, we decided it was cheaper for me to just go to Japan. So against everyone's good counsel I packed me and the majority of my meager possessions and sailed into the sunset.

I arrived December 1, 1984, and spent the first 9 months living in Kobe. Yas lived a mere 2 hour commute away. Closer, but still not ideal. His aunt and uncle lived about a mile from me, so I was not completely alone. Any serious problems I could go to them, but only Uncle speaks English and I speak only broken Japanese. So now we could see each other on weekends - just like dating. Yas still wasn't ready for marriage, and I was beginning to believe he never would be. But a minor miracle was worked and we finally made it past the altar. After which we still had to live 2 hours apart because we couldn't move into 'our' apartment for another month. Our respective domiciles were too distant from the other's place of employment. Well, we've been at our current location for a year now. I've had no problem receiving mail addressed in roman letters, but for those who can read it, the kanji is:

〒569 大阪府 高槻市 古曽部町 2-15-1

高槻ブランドハイム 302号

I can see the deadline looming up in the distance, so on to

#### MAILING COMMENTS

- 555 Times (What's the origin/meaning of that title?)  
re. deadweight -- drop it.  
For all the reasons other people have already mentioned. After all the hints, warnings, goads and pleas, any remaining silence speaks for itself.
- (42) Dreams/Desires  
Donna It's fine to want children (or anything) so much, but try not to be obsessed with it. I've always believed that all things come when Time intends - as much as we would like to change that. Also, all the pressure and worry ain't gonna help. Best wishes, but patience too.
- As for names, our family is just full of very mundane names. But go back a few generations on Dad's side and you'll find a few unusual ones.
- (42) Wandering...  
Eric From your descriptions you went through Europe so fast you didn't get a chance to see what any one place was like. For myself, I prefer lazy strolls to whirlwind tours. Your escapades seem to fit right into the stereotype American tourist.
- (42) ..Alone With...  
Barry Since I've been out of things for quite some-time, I feel a bit disadvantaged when you discuss your PhD work. What are you working on? What kind of experiments are you asking your elves to do?
- (42) ..Footnote...  
Bill Good to see you in print ~ or anything else for that matter. As usual, full of fascinating facts.
- (42) I Lift My Lamp...  
Greg I know what you mean about trying to decide what to do during a quake. We've had a few tremors here. Fortunately nothing serious. Mostly they just reminded me of when I was living in a wood frame house and a loaded truck drove by. I've been told that when The Big One comes, there'll be no gradual build up of strength. You're suddenly at n.5 and no time to deliberate on what you should do. The folks here have lived with quakes and in the most vulnerable areas there are evacuation plans already prepared.



(43) Bunya-Bunya

David

Good to hear your job situation has stabilized. Any hints on what's in store for OryCon? I doubt if I'll be able to go, but one never knows.

(43) ..Vacation..

Rolf

I've been following with fascination the progress of your home repairs. Did you have prior experience rehabbing houses, or are you picking it up as you go? Any particular books you're using as reference material?

(43) T. T.

Rod

Congrats on passing your karate test. Is there a maximum level, or do the ranks slide to infinity?

Do you have a spare copy of your grad socio paper? If so, I'd be interested in reading it.

Some foreign phrases have crept into the Japanese language and are now used as Japanese words. Much the same as English adopts and alters words from other languages.

(43) Crumbcrunchers

Susannah

Quilting is one of those things I'd like to do but never have time for. I tried to make a quilt once, but it turned out disasterously. Maybe I'll try again sometime. My artistic bent is for needlepoint and crewel stitching. I haven't made my own design for either stitching yet, but that's another thing I hope to do in the future.

Dave

Will this be the first time you are taking the P.E. exam? If yes, why did you decide to take it now?

(43) Give Peach ...

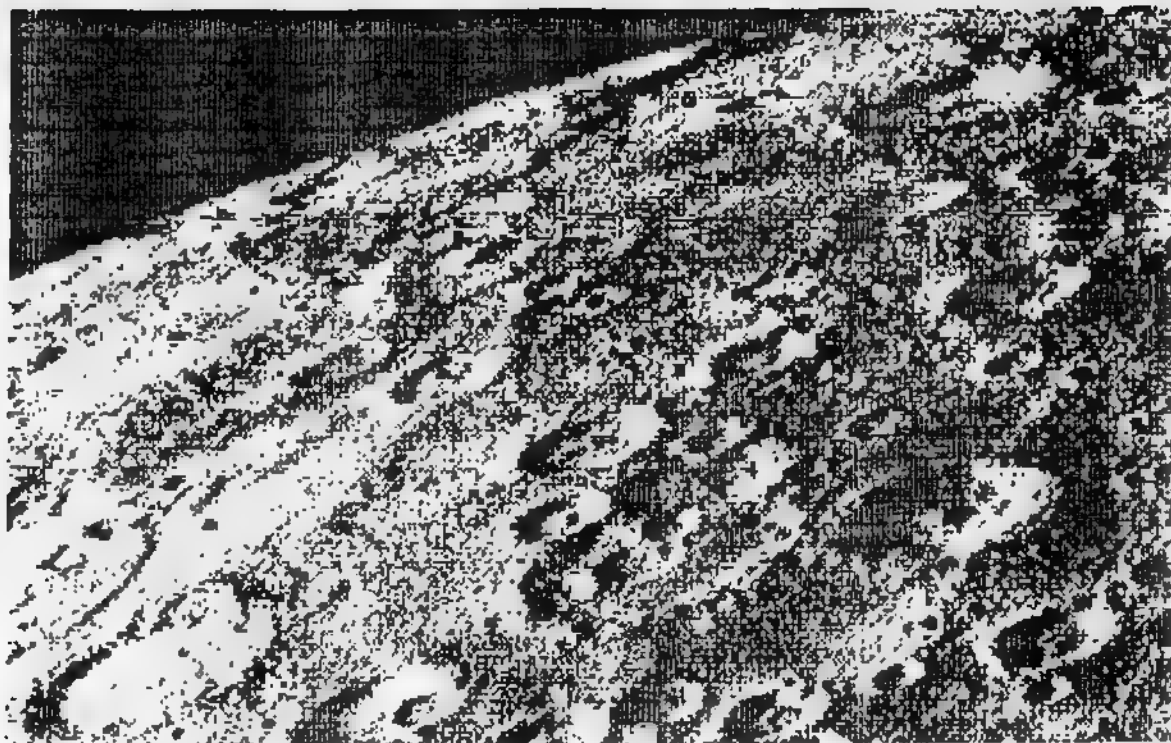
Greg

I must say I too thought about doing an *12/1'* design. Though no concrete idea yet. You show me yours and I'll show you mine?

I'll leave you with the standard Japanese farewell --  
kiotsukete ..... be alert.

*Linda*





## Letter from Easton

**Guy Consolmagno**  
200 High St.  
Easton, PA

215-252-5020

**Welcome to Weird Graphics Showcase!** Where I try out all sort of strange things on my Mac...

I'm playing with a program for page layout called "ReadySetGo", which was obviously designed with my mind in mind. This is tremendous fun, playing with layouts. You saw an example of it last month...you'll be seeing more of it, I'm sure.

As one irate letter to a computer magazine reminded me, and as I am currently demonstrating, just because the computer can make doing page layouts easy doesn't mean that it makes them good...one must still have some sort of idea of what the hell they are trying to do with the layout, besides having fun. But for me, having fun is sufficient excuse.

I got this program for another book I'm working on...last month I told you about the one that actually has a publisher, but this other book is a planetary science textbook which I am just typing up for the class I'll be teaching next term. No publisher in sight for it yet. But that's ok, I get to play desktop publisher and have fun myself. I'm not sure it'll get me tenure, though.

## Mailing Comments!

**Barry:** It's tough being in an APA with two Guys, but not unheard of. Back in the MITSFS there were two of us, known as Guy<sub>1</sub> and Guy<sub>2</sub>. Being the elder, I was Guy<sub>1</sub>. The other Guy was Guy Harris, a much more active fan than I...last heard of living in the Washington, DC area. This was about 5 yrs ago...wonder where he is now?

As for turning thirty...there are lots of age jokes around me, some of which I encourage, because many of my friends are McKeivv students living here with me, and they're all 18-21; my best friend, Anne, is only 22 (and we've known each

other for 4 years). A few years ago, I was dating a woman who was only 17, and had the pleasure of taking her to see Manhattan (the Woody Allen movie). On the way back from the film, we stopped in at my office, where she was introduced to a fellow post-doc. "And what do you do?" he asked, trying to be polite. "I go to high school"...(actually she'd graduated...two months earlier. It was a strange but fun scene; she's now a wealthy Yuppie in San Francisco. So, yes, I am 34; but it's all right, I'm very immature for my age.

**Bill L.:** Weird SDI comments...but funny.

**Bob T.:** Say hello to Detroit for me! I lived in Harper Woods till I was 6, then the northwest suburbs; I went to U of D High (Class of '70, rah!). It all seems very strange and foreign to me now. I still have a close friend, Mike Timmreck, who lives there (Hey Greg...news from Mike; they just bought a house! How strange, to have an old friend who's now a family man, living in the suburbs, with a wife and kids and two cars and a steady job...) Mike used to be the Skinner of MITSFS, and a big comics collector; I suspect his family ways have cut into that nowadays.

**Donna:** Virtually every one else lives like they do in Kenya...all of Asia, except Japan but including China and Indai and non-Russian USSR; all of Africa except white South Africa, but including the Moslem countries; all of Central and South America. Easily 75% of the human beings alive today live with 1) homes with limited, if any, running water; 2) limited access to modern health care (i.e. the doctor being more likely to cure you than kill you with the treatment); 3) no expectation that justice can be had in the local legal system; 4) no concept of freedom of speech, assembly, or worship; 5) less than 3 changes of clothes; 6) no belief that things like the nuclear arms race, or going to the Moon, or the computer revolution actually affect them in any way, much less that they could have an effect on any of these things. Discover magazine, a few issues back, had an article about an American doctor in India that was fascinating, says all this better than I could.

**Roxanne:** About the Nephelim...funny you should ask. I just picked up the latest Madelene L'Engle book, Many Waters, in which they figure prominently. (Not one of her better books, but interesting as always. Does anyone know of a place where her multiple universes are explained clearly?)

Anyway, it got me curious, so I went to our local library and dug up the following commentary from an exegesis of Genesis which I will reproduce here, in violation of copyright laws and decent practice--I forgot to note the author or title of the book, turkey me! Anyway, here's what modern scholarship has to say about that paragraph in Genesis:

Among the ancient peoples, as we know, various myths were current telling of sexual relations between gods and daughters of men, and of the children born from these unions, who were regarded as half-gods or were raised to the full status of deities. Also among the Canaanites, who were closest to the Israelites, there existed legends of this kind, as the Ugaritic inscriptions testify...

The Torah, in the paragraph under consideration, takes up an attitude towards these myths and the concepts flowing from them. The reader who has come thus far [reading Genesis] might ask: "I have now learnt how the human families, the offspring of Adam and Eve by the natural process of procreation, were born and multiplied; but I know [from the legends of all the peoples surrounding Israel] that in the past there lived upon the Earth giants, men of far greater stature and strength than ordinary people; we even have a legend from our forbears that when they entered The Land they still found there some of the surviving giants. What was their origin, seeing that they did not resemble human beings like ourselves?" To this question, which might arise in the reader's mind, the Torah proceeds to give an answer.

The explanation it offers contradicts the gentile legends we mentioned above. Following its usual practice, the Torah does not engage in any polemic or argument here; it merely explains, in harmony with its outlook, the origin of the titans, and from the affirmations one may deduce the negations. These colossi are in no way related to the Deity, but only to the "sons of God", that is, to the members of the Divine household, to God's ministers, more particularly to the lowest orders among them. The subject is treated with extreme brevity. Of set purpose, the Torah compresses its words into a few sentences, as though it wished to convey that it finds the entire topic wholly uncongenial, and that the subject is mentioned not for its own sake but in order to disabuse the reader's mind of certain notions. The declaration in verse 3, "My spirit shall not abide in man", etc., implies: Do not believe the heathen tales about human beings of divine origin, who were rendered immortal; this is untrue, for in the end every man must die, "in as much as he, too, is flesh". The sons that were born from the intercourse of the sons of God with the daughters of men were, in truth,

gigantic and mighty; yet they did not live for ever, but had long ago become extinct. And when they lived, it is on the Earth they lived; even before their descent to Sheol, they were only on the earth, and were never translated into heaven. They were the men of renown; indeed, of renown, but men and not more than men.

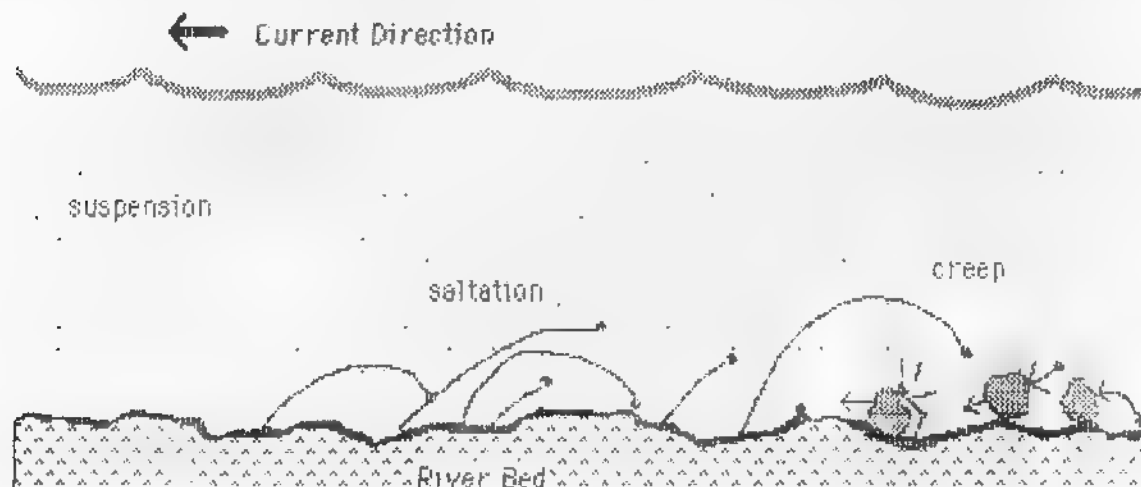
The Torah's intention is to counteract the pagan legends and to reduce to a minimum the content of the ancient traditions concerning the giants.

## News from Easton

So what else is happening here? Life continues its busy pace. I got a new issue of Twilight Zine from the MITSFS...it is nice to know they still remember me, or maybe they're being nice precisely because they don't remember me anymore!

Our 14" telescope is great fun.. We were able to make out the Red Spot quite easily tonight, which is impressive only if you know that in the past few years the spot has turned a light pink and is very hard to see anymore. The Ring Nebula is also a breeze, and quite impressive; less so are the Galaxies, which I always expect to look like the photographs, even though by now I "know" better.

I also just got in the mail today an "Armillary Sphere" kit, made of cardboard



balsa wood. I haven't built it yet, but it looks like fun.

Here at Lafayette College there's a tradition that every other year the faculty put on a n original "faculty show"; being an utter ham, I have gotten involved with it this year. The theme is always the same, dealing with the trials and tribulations of a mythical small college in eastern Pennsylvania called "Lackawanna College" which of course bears no resemblance at all to Lafayette...it's great, because not only do I have the fun of being in a show, and getting to know the other faculty

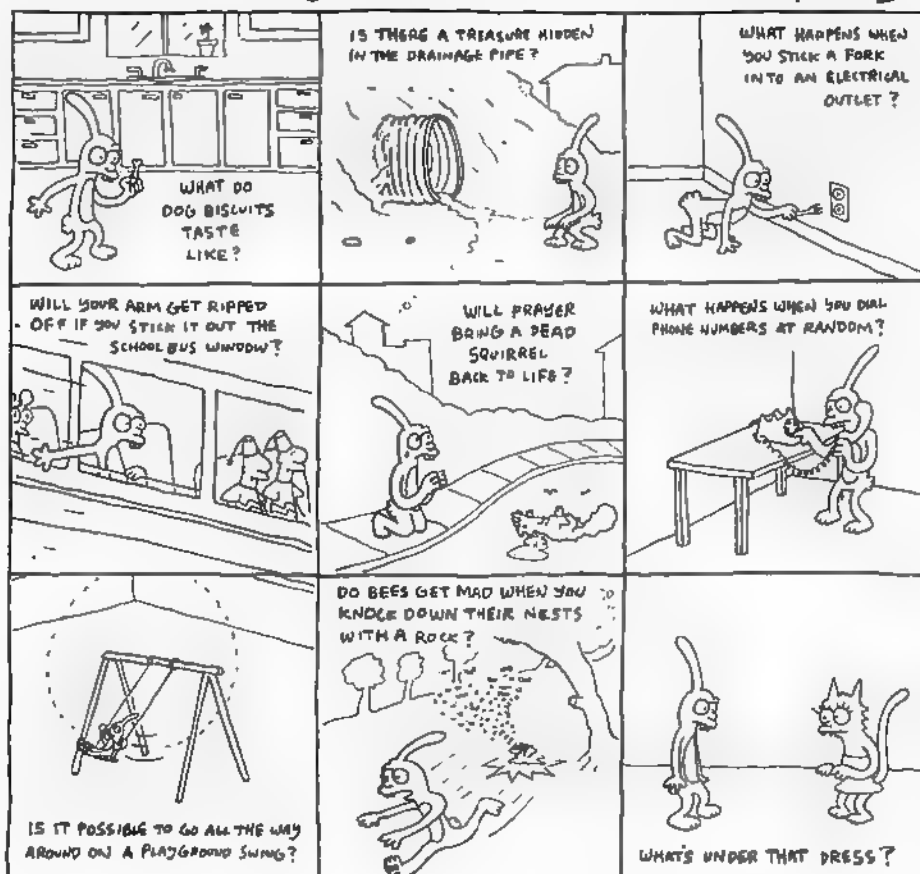
members, I also get to learn all sorts of in-jokes about the school and its traditions... most of which would make no sense, or difference, to an outsider. I'm playing the role of a college student, a typical "Pard" as he'd be called here (we're called the Lafayette "Leopards", shortened to Pard, possibly in connection with the fact that the oldest classroom building on campus is Pardee Hall.) Very strange. I always played the parts of old men when I was acting with students at MIT; now, acting with old men, I play the part of a youth. I must be at that sort of in-between age. Oh, well.

Picture Credits: Front Page, Mercury as seen by Mariner 10; page 3, a diagram from my textbook explaining the difference between three types of sediment transport in rivers; below, a cartoon by Matt Groening from his book, Love is Hell.

LIFE IN  
HELL

©1984 BY  
MATT  
GROENING

## CHILDREN'S SCIENCE EXPERIMENTS





TRANSPORTER  
TOPICS

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Number 40

An interesting little technical note, here. Apollo lunar samples revealed that the lunar regolith is rich in Helium-3. It turns out that this isotope is one of the easiest fuels to achieve fusion with but that there is very little of it on earth. One estimate is that twenty tons of Helium-3, which would satisfy US energy requirements for a year, would be worth about \$50 billion. No monetary cost/benefit ratio was mentioned in the note I read but the author did say that the energy payback would be 250 to one. Since coal brings 16 units of energy for every unit expended and Uranium 20, we might be justified in mining the moon to feed our power needs. Building the fusion plants on the moon would most likely be even more cost effective, especially if some of our most power-hungry industries are moved there or into orbit.

Strategic Defense Initiative

I promised that I would cover this, so here it is.

From a technical standpoint, there is no part of the proposed multi-level defensive system which could not be built with enough money thrown at the problem. People object to spending money on such things as lasers and advanced computer programs but these problems aren't unique to SDI; they will have to be solved eventually for other uses. (By the way, you may have heard it exclaimed that it is currently impossible to write the hundreds of thousands of lines of programming needed and have them error-free. I am told by the systems operator of a moderately large IBM computer array that there are already systems in use with more lines of code than that. Admittedly, they are not error-free but they run quite well for the vast majority of the time.) It is true that some of the devices being developed may never live up to the hopes held for them but we won't know that until we do the research. By following several paths we reduce the chance of putting everything into one basket and then dropping it.

Some people object to SDI because it won't be one-hundred percent effective. It doesn't have to be. The fact that the majority of ballistic missiles aimed at us will be destroyed means there is serious doubt as to whether the primary military objectives (destruction of our missiles) will be obtained. That would tend to give an attacker second (and subsequent) thoughts.

Others claim that there are countermeasures which can be used to deceive or otherwise render useless our defense. Yes, there are many potential tactics being evaluated, everything from simple decoys to using a depressed trajectory to keep the ICBMs' path of travel as short as possible. None of these is completely effective and all involve some sacrifice. In many cases the expense of an effective countermeasure would be prohibitive.

Then there are those who believe that SDI involves weapons of mass destruction. This is a complete fallacy. The lasers, particle

beams and projectiles proposed are more akin to a sharpshooters' rifle than anything else. They all lose effectiveness rapidly when traveling through atmosphere. None of these can destroy a city or even a battleship. They might - might - be able to demolish a high-flying aircraft.

Here we have a first in history, a weapon which cannot be used against the general populace. It is intended strictly to prevent an attack. I have been in favor of the idea since I first heard about it in the late sixties. I still am, and have trouble understanding why some people are against it. Any rebuttals? I read Bill Leininger's comments with interest. Let's have some more of this.

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How many of you are watching "Out of the Firey Furnace" on educational TV? Some parts are a bit slow but overall it is eminently watchable.

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#### Mailing Comments

Chair: Printing the roster every three or four issues (every two of yours) seems like it would be enough.

Barry (you know who I mean): According to my unabridged dictionary, a borborygm is rumbling in the bowels. Sounds like what I have been suffering from the past couple of years. \* I graduated highschool in 1973. Please remember that KY is generally 5 to 10 years behind the nation as a whole. It wasn't only human instincts they didn't admit. Continental Drift was an old theory which right thinking people smirked at. \* Did you read "Magnus, Robot Fighter" and the various Thunder Agents comics? I believe "Doctor Solar" was Gold Key. I can look in my collection if you really want to know.

Bill L.: Sounds like you've been living the Chinese curse. \* My system operator friend claims he knows some dozen or more odd computer languages, so many that he has to mention in the documentation of programs he writes which one he used. \* An Amiga version of Deja Vu? I think I've seen it. (Ouch!) \* I have some survivalist friends who like to guess what stage of personal alert they should be at during movies about nuclear attack. Usually they have bugged out just before missile launch, making it to the farm of one member's parents shortly before the mushrooms start sprouting. The writer of one magazine article I read says that he has a blasting cap on the end of a length of wire hanging from a tree outside his house. When EMP sets this off, he knows the warheads have started falling. Since Frankfort would be a tertiary or quaternary target I would most likely have plenty of warning. \* One of the basic concepts behind SDI working properly is that both side must have it. Reagan has even volunteered to share our data with the Russians. \* Actually, the overall Russian life expectancy has been dropping in recent years. Soviet authorities have actually stopped publishing life expectancy information. \*

Bob Trembley: Welcome. \* I used to play and ref Traveller a lot. I finally burned out on it and switched to Space Opera. \* Write longer. Too brief.

Rolf: Yes, I have managed to appear 38 times in 43 issues (now 40 in 45) but if you notice, my 'zine is usually in the back, indicating that it was the last to arrive. I do my best work under pressure. \* The new version of my word processor (Scribble!) has a 40k word expandable dictionary. I hope to buy a copy sometime soon. \* You're working for USGS? I like their maps. \* Have you heard about the Turbo Amiga add on? It replaces the 16/32 processor with a full 32 bit unit

and a math coprocessor. Gives you the equivalent of a VAX minicomputer on your desk top. \*

Crumbcrunchers: I've had similar problems reconstructing past creative work when several chapters of my novel were erased (backup too) and I had to re-write them from my notes. Some of the joy was missing. \* You want life extension non-fiction? Why didn't you say so! Martial arts, too? Great! \*

Alice: RAEBNC

Donna: ReYrCmnt Bill ReHisCmnt Barry there is a book called "Rumors!" which explores the truth behind various outrageous stories. \* How are the asterisks working as seperators?

No Title Roxanne: 1955 was a very good year. That's when I was born. Someone has made the comment that the eighties are the fifties in color. \* Your vacation tale reminds me of the camping trips my family used to make.

Easton Letters: A basically non-social person, I never got into the dating/sex game either. Not so much from lack of interest as lack of opportunity, since I never had much inclination to try participating in the standard highschool courtship ritual. \* Congratulations on your astronomy book.

Blues Bro.: It seems that half the people in the APA are having their place of employment gobbed up. Fortunately, that can't happen to me unless the Feds decide to take over the state government. \* I love old machines. I am the proud inheritor of an Edison upright cabinet phonograph, 78rpm. It is a marvellous device.

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I may have discovered the origin of the legend of ogres. I know of a family where some of the members undergo what is known as a second puberty. The archetype of this group, a Louisville fan, is 6' 9" tall and weighs 280lbs. Like Doc Savage, he is proportioned so that he dosen't look that big from a distance unless he is standing next to something of known size. By his account, both he and his father have torn a door off different cars by the simple expedient of ramming their hands through the sheetmetal, grabbing the interior beam and yanking. The father did this to free his wife from a wreck and the son did this because some idiot was playing games by blocking him from crossing the street while he was trying to get to the hospital to see how his mother was. No, they are not from Krypton, KY.

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Fans interested in firearms may want to look for the third edition of Pistol and Revolver Digest. Among other pursuits, the author, Dean A. Grennell, has written some science fiction, although I can't remember reading anything by him aside from this. The thing is full of valuable information, interesting anecdotes and outrageous puns. I recommend it.

That's all, folks!

*Rodney E. Smith*



# BORBORYGMUS

BORBORYGMUS #2  
another disturbance for APA-TECH  
from Barry Gehm

Sam Paris complained that I am driving him to buy a better dictionary, since the cheap one he owns does not list "borborygmus." I told him it was all for the best, since he'll want a better one when he reads THE BOOK OF THE NEW SUN, which I then forced on him. Remember, God fights on the side with the biggest dictionaries.

**Dark doings in Ann Arbor.** Lee Hart hosted the third annual Ann Arbor GT berserker the last weekend in April. Among those taking advantage of this lapse of judgment were Donna and Tullio Proni, Guy Wicker, Bill Higgins, Bill Leininger, Guy Wicker, Todd and Mary Lynn Johnson, Sam Paris, Bob and Connie Trembley and daughter Rachel, Bonnie Jones and I. Chris and Cecille Cloutier put in an appearance, and Tom Snoblen provided spillover crash space. Apologies to anyone I've left out. It was easy to miss people, since when we arrived, rather late Friday night, Lee's neighborhood was suffering a power outage that had been going on most of the evening and lasted well into the night. We had driven past the house a few times, thinking that the house with the party would at least have a porch light on. Finally we recognized the place. Inside, people were sitting in a living room lit by two flashlights. I got my big fancy flashlight out of my car and put it in the main window so the fluorescent lantern faced inward and the alternating red and amber flasher faced out to the street. People arriving later said they didn't have any trouble guessing which house held the techie party.

The berserker was fun but Bill H. and I had to absent ourselves from some of the festivities to work on the Bear and Billy Show (vide infra). We did manage the usual economic suicide squad attack on AA's wonderful bookstores, and consoled ourselves with visits to Drake's candy store and Zingerman's deli. We also got to play with some of Bill Leininger's fancy audio processing hardware/software for the Mac. Do-it-yourself backwards masking and Max Headroom impressions can now be yours!

On the way home from the berserker some of us stopped at the Space Museum in Jackson, MI. Oddly enough, the thing we had the most fun with was the jungle gym in the playground outside. I found out I can still hang by my knees (and get up and down from that position without killing myself). Bonnie took a rather strange photograph of Sam Paris and me hanging upside down. It looks more normal if you turn it upside down, but only at first. They also have a scale model of the inner solar system outside the museum, with the Sun played by a two-foot ball of granite and little spots on plaques dozens to hundreds of feet away representing the planets. The gas giants are omitted for reasons of space (their positions would be beyond the grounds of the campus the museum is located on), but supposedly there is a plaque on the wall of some building across town that represents Pluto. It gives one pause to think that on this scale, Alpha Centauri A would be another two foot ball somewhere in or near Australia.



4. A robot must not kill vaudeville, or, through inaction, allow vaudeville to be killed.... Two weeks after the berserker was ConClave, which for the past eight years has invited Bill and me to do the Bill and Barry Show as a featured program item. This year was a little different, since Bill had gotten the idea of having Teddy Ruxpin and one of his Siamese non-twins, a similarly animated caterpillaroid called Grubby, do some comedy schtick in our voices by way of introducing us. We wrote and recorded a six-minute routine of jokes and song at Tom Snoblen's house during Lee's berserker, and Todd and Mary Lynn did the animation for us. It went over pretty well, despite my misgivings, and since the worm used Bill's voice, we called it the Bear and Billy Show, so Steve's cartoon came true in a way.

Conclave's Fan GOHs were Rochester GTers John and Joanne Hall, who are famous for their Hall Parties, and Pro GOH was Greg Bear, whom I got to meet for the first time. I had talked to him on the phone to get some background on him for my review of BLOOD MUSIC in Pyro -- he remembered me and said he had liked the review. He and his wife, Astrid (Poul Anderson's daughter -- the Andersons were also there) dropped in on the techie party and enjoyed some of Bill and John's ukulele-and-guitar duets, so I saw a lot more of the GOHs than I usually do at conventions.

Speaking of Greg Bear, I just finished EON and I recommend it. If you like Niven and Clarke, you'll almost certainly like EON.

#### MAILING COMMENTS

Bill (More or Less) Leininger

Welcome back! Or, since I wasn't in the apa when last you were, just plain

Welcome! What a great zine. Your proposal for Nine Minutes Inc. was just the sort of thing I hoped I'd see in APA-TECH: well-reasoned, thoughtful development of deranged ideas. Unfortunately, (...) it was so well thought out that I can't think of anything to add. (Except this: have you considered sending it to George Ewing's 101 RADICAL SUGGESTIONS ?) == I was reminded of your comment about SDI making the world safe for conventional warfare during the recent flap over the supposed near-agreement to eliminate (depending on who you listen to) anything from most intermediate-range nuclear weapons in Europe to all nuclear weapons on "both" sides. Suddenly a lot of people are realizing that we aren't ready to fight a conventional war with somebody our own size anymore. == Do you mind if I ask why you don't capitalize words like "american" and "russian"? == Was the thing about yogurt written by you or clipped from somewhere? The unexplained change in font threw me off. Actually, those incredibly old folks in the Caucasus don't eat yogurt, except when the Dannon people show up and say "Eat this and we'll put you in a TV commercial and pay you more money than you make in six years." Then they eat yogurt. == Turn me on, dead man. Turn me on, dead man...

Bob (Wasn't) Trembley

Welcome also! Nice to see some new bylines around here. Nice also to see

you and Connie and Rachel at Lee's and at ConClave. I have to say that Rachel is about as cute and well-behaved as an 18-month old can be. If she's an example, I don't worry so much about GT children. == Paint peeling? I didn't realize the stuff was that resonant. == Sorry I couldn't make it to your berserker -- it was scheduled too close to too many other fanacs.

Rolf (Doesn't) Wilson

How come I never get to the conventions where they have trivia contests anymore?

"I go to the wrong conventions" is right for ten points.

Susannah (Crumbcrunchers) West

Suggestion for making it possible to quickly resort scrambled index cards:

When the cards are in their correct (final) order, draw a diagonal line across the top or bottom edges of the stacked cards with a felt-tip marker. If the cards then get scrambled, they can be put back in proper order without having to read each card and trying to remember what came ahead of it or behind it. Most publishers use a similar method to make it easy to quickly confirm that the signatures going into a book are in the correct order before binding. == I'm glad to know at least two people (other than the authors & editors) read those blimp articles. == The reason MultiMate insists on capitalizing "Realtor" is that "Realtor" is not a synonym for "real-estate agent" but is a trademark designating a member of the National Association of Real Estate Boards, who are very picky on that point. "Gypsy" is, after all, an ethnic group like Slavic or Teutonic.

Alice (Again) Bentley

Hope to see the house soon. How is Higgins surviving not having you two

next door anymore? Hope to make it to Windycon or Chambanacon, doubt I can make it to both. == Did Mike get the book finished? What will he do next?

Donna (Mostly) Proni

My caption "How You Should Have Voted for the Hugos" was intended as

humorously mock-arrogant (...) and as a comment hook (gotcha!). I hope you don't think that I only consider scientific accuracy when I judge a story. If you take another look at my reviews in PYRO you'll see that is emphatically not so, even though I slant my reviews for PYRO toward an emphasis on scientific accuracy because I see PYRO as "the hard sf fanzine." I thought ENDER'S GAME was good but I ranked BLOOD MUSIC ahead of it because it broke more new ground, in my opinion. CUCKOO'S EGG managed to bungle almost the only bit of real science in it, but my reasons for ranking it below no award were other than that. 1) It was a novella inflated by big type. 2) It was a one-punch story in that the only thing that kept me reading was the desire to find out why aliens were raising a human baby. 3) Although the whole point of the story was that the aliens were so alien that they needed to raise the human baby to bridge the gap between human culture and theirs -- they all went mad if they tried to understand the messages from Earth -- the aliens were incredibly mundane and would not have felt out of place at a Kiwanis club meeting. That would be a serious flaw in any sf novel, but when it's a novel predicated on the incomprehensible alienness of the aliens, it's a mortal failing. I've liked several of Cherryh's books, but CUCKOO'S EGG was rotten. == Re: English's official status: I have heard, though I cannot attribute it, that George Bernard Shaw tried to get his spelling reforms adopted legally in the United States and some judge ruled that since the Constitution was written in unreformed English, that was the official and constitutional form of English and adopting another form would require a constitutional amendment. This is at least third-hand, but I present it for what it's worth. ALL THINGS CONSIDERED today (Oct 25) carried a report on a drive in California to get an amendment to the state constitution specifying English as the official language. This has apparently been done or is being attempted in six states, and the group behind it is considering a national drive. Obviously, they don't consider the matter settled to their satisfaction. One of the leaders of the group is S. I. Hayakawa, formerly of General Semantics and the U. S. Senate. == The reason I routinely say "monosodium glutamate" instead of "MSG" is that "monosodium" and "glutamate" both mean something to me; "MSG" doesn't. Also, by my standards,

"monosodium glutamate" is not a particularly long "word." Biochemistry is full of long words. Some stuff I use every day is called phosphatidylinositol-4,5-bisphosphate; we generally call it PIP<sub>2</sub> (pea-eye-pea-two). .

• It's now 1:30 am for the second time tonight. I'll hope to get the rest of these mailing comments done some other night before deadline. •

Later...

**Roxanne (Title) Shields**

Nice description of the trip to Atlanta.  
Camping your way to Worldcon is a neat

idea. ≡ A Secular Humanist Revival Meeting? I have to admit it's an interesting concept. Doesn't it sort of reinforce the idea that secular humanism is a religion, though? ≡ I think you have taken the use of the word "civilian" in the space program a little too literally. I don't have the references to check this handy as I write this, but I am pretty sure that a number of the shuttle astronauts or mission specialists before Jake Garn had been non-military personnel. The term is used loosely to refer to people who are not part of the Organization, the same way cops do. ≡ Regarding the Nephilim being "on the earth", you ask "From Moses' eyes, where else could they be?" Under it, for one. "On the earth" I would interpret as meaning not dead and buried, not extinct, still around. The sf-ish interpretation ("on the Earth" as opposed to "on some other world") is contingent on a context for the word Earth that did not exist when Genesis was written. The most common interpretation of this passage that I am aware of is that there was a tribe of near-giants so much larger and stronger than the Israelites\* that they seemed semi-divine. (Maybe they claimed to be gods or sons of gods; it was probably unhealthy to argue with them.) When they impregnated Israelite\* women (the "daughters of man") their children were also naturally somewhat larger and stronger than the common run and became renowned for their might. I suppose it all depends on what you mean by an "alien life form." In those days, an alien life form was somebody from the other side of the river.

\*"Israelite" is an anachronism, read "pre-Israelite" \*\*Some scholars suggest they were angels.

**Guy (Easton) Consolmagno**

A friend of mine once suggested that we not-entirely-by-choice celibate techies

ought to start a monastic order. I think he wanted to call it the Brotherhood of St. Elmo. He also suggested we could work at reactors and other mutagenic jobs. I'm not sure whether this was Higgins or phantom techie Mike Brandl. ≡ TURN LEFT AT ORION sounds great! Keep us posted! ≡ Some mailing comments would be nice. ≡ a. Backward, because the air in the car, which is heavier than the balloon, moves forward and pushes it "out of the way." (General relativity !?) b. 3.6 meters/sec/sec [9.8 x tan 20°]. Maybe I'm missing something, but it seemed trivial to me.

**Steve (Eastmancolor) Salaba**

I've driven past the signs for the Auburn-Cord museum any number of times,

but never gotten around to seeing it. It sounds impressive. ≡ Are Bill and I telepathically linked? Sometimes it seems that way. We do manage to come up with complementary (rather than the same) ideas/jokes/etc. an awful lot of the time. Once we drove past a place called "The Pendulum Lounge." Bill turned to me and said, "Hey, that must be--". And just as he said "--a real swinging place," I said, "--the pits." Is that telepathy or anti-telepathy? (tele-antipathy?)

**Rod (Transporter) Smith**

I like the joke about duct tape. Does that make MacGyver a Jedi knight?

"GO OUT THERE AND WIN ONE FOR THE CRIPPER!"

Bonnie Jones  
129 Burcham #1  
East Lansing, MI 48823

You know the old joke about the kid who was writing a letter to his mother slowly because his mother couldn't read very fast, well . . . you will have to read this one slowly because I can't type very fast. You see, I broke the ring finger of my right hand playing volleyball. (All right, you can stop laughing now.) It is interesting how some injuries provoke very little sympathy, like volleyball, or falling in the toilet. Ask Barry. (No, he did not fall in the toilet, he broke his ankle playing volleyball some time ago.) Actually, I'd just as soon say I was injured rescuing three children from a burning building or something like that just to get a little respect.

The most common question goes like this:

"What did you do?" "I broke my finger." "All that for a finger?" "Well, they had to go in and pin it." "Oh."

Since you cannot see my hand I will describe it. (Don't worry, no blood and guts.) At first glance, you see an elastic bandage with strips of white tape that starts just below my elbow and travels down the arm expanding to the size of a softball at the base of my hand, then tapers to the size of a tennis ball two inches past the end of my last two fingers which are somewhere inside (I hope). The other three fingers look rather small and inconsequential sticking out of this Moby Dick of a bandage. As I understand it, there is a waterbed supporting my finger and a plaster cast covering 3/4ths of the way around (open on the side my fingers stick out) which is covered by layers of gauze and cotton, and then the elastic bandage and tape. Very soon though, I will be switching to a finger-sized bandage.

Now for the blood and guts. (Anyone with a weak stomach, leave the room now.) The fracture was in the bone that starts at the end of my finger. This bone makes a U shape around the joint, top and bottom, and the top piece broke off and was floating above the joint. The pin is in the main bone and the piece parallel with the finger. They also sewed it, by wrapping wire around the chip and bringing the wire through and anchoring it with an honest-to-Ghod button on the palm side of the finger. The pin stays in for about four weeks. By that time, there is enough stickiness (medical term) to hold the pieces together. END OF ICKY STUFF. YOU CAN COME BACK NOW.

I got to be awake for the operation. I didn't see or feel anything, but the tourniquet around my upper arm was quite uncomfortable. The operation was on Saturday, the 18th. I had the choice of having it on Thursday or Saturday, the day before or after a test. I chose after. Sam Paris came up for the weekend, mostly to make fun of me in my hour of need. The week before, he had called me up to wish me good luck for a paper I was presenting, waking me up out of a

sound sleep, and then laughing when I told him I had broken my finger. Some friend. I would have to break my finger a day and a half before a professional conference where I had to present a paper as part of my graduate requirements. Of course, I was the talk of the conference, even though I missed most of it. By the way, the presentation went very well, thank you. Also, the conference was why I missed Conclave. Sorry. p.s. The doctor's name was Smith.

I am currently carrying out research for my master's degree in geography. I am testing elementary school children for their ability to use different map projections. It is a very simple task. I show them places on a globe and have them find these places on world maps that are designed using different projections. The maps are just continent outlines with the graticule (longitude and latitude lines) just on the water. The students I am testing are three classes of 6th, 4th and 2nd graders.

The other day I was talking to a fourth grade teacher in the East Lansing school system. She was hanging up pumpkin stories that the children wrote. I asked her if they were scary stories. She said no and went on to explain that there was a religious faction that didn't believe in devils and witches, etc. and so she wasn't allowed to talk about Halloween when children of that faith were in her class. She did have children of that faith last year so to be on the safe side, she didn't cover it this year either. Well, all I can say about it is THAT'S WHAT YOU GET WHEN YOU HAVE NO STATE RELIGION!

STEVE: Where does Dracula rent hearses?

At the Boris Car Lot!

DAVE: re: Donna re: "Don't Die" I concur with your opinion of the phrase. If I'm not sure when I am going to see the person again, my send-off is "Have a nice life."

LINDA: Great to hear from you! I hope you have better luck with Japanese than I had with Chinese. Of course, I was in China for only eight weeks and had language instruction for only six weeks. The first words I pick up anywhere are "excuse me", "how much" and "Where's the bathroom?"

GUY: Your book sounds terrific! I could sure use your book since I am definitely a casual observer.

ROLF: I don't wish to complain but I found your submission for #44 rather difficult to read. I realize you were trying to get it all on two pages, perhaps a thinner type style would help.

BILL-EL: Your apa was certainly food for thought. Nice to have you on board.

GTB: Your idea of printing the roster only when it changes is fine with me. I do use it occasionally to look up an address.

ANDY: Where are you? I know you have things to write about.

Final Comments: I expect to be at Windycon and will try to get to the Bentley's housewarming. Bye.



## LEMONADE STANDS FILL THE AIR

\*\*\*\*\*  
A breathtakingly (but, alas, necessarily) brief missive from W. Skeffington Higgins. This will be Spinthairiscope Media publication number Twenty-Five, for Apa-Tech 45. at 853 Lorlyn Drive, Apartment 1E, West Chicago, Illinois 60185. Phone number is (312)293-1050. Office address: MS 355, Fermilab, PO Box 500, Batavia, Illinois 60510.  
\*\*\*\*\*

### Open Mailing Frequencies, Lieutenant

I'm not going to apologize for doing an entire zine of mailing comments-- though I've never done it before. Why, you people are just so chock full of downright insight that a body could keep on discussing your thoughts forever...

### Mailing Comments on Apa-Tech 42

Donna-- Top Gun increased Navy recruitment? By a lot? Hmm, bad news. I'd rather not have my country defended by a bunch of disgruntled characters harboring simplistic fantasies (present company excepted, Eric & Tim...). A guy wants to soar among the clouds chasing MiGs, but he winds up swabbing the decks or shoveling pitchblende into the radium furnaces instead, it's gonna make him mighty unhappy.

Linda-- Please forgive me, but every time I see the name "Linda Struwe Matsushita," I think, "Mrs. Panasonic."// Boy, your zine sure got an enthusiastic response from other members in later issues. Hope you plan to continue your accounts.// Just how do doughnuts filled with bean paste taste?

Eric-- Yeah, like Rod I would like to know the Orion's job, and a bit about her specifications, consistent with security rules, of course. And just what is your own job aboard? And why does "Department of the Navy" stationery have a Dept. of Defense seal on it, instead of a Navy seal? Does Army stationery also feature DoD seals?

Tim-- Hmm, not too much information here, other than that the Navy is not a winner. You may be amused by a bumper sticker I saw:

BE ALL YOU CAN  
BE  
WORK FOR PEACE

But then, I am one taxpayer who believes that working in the Navy really does have something to do with working for peace.



Valli-- Nice to see you in the apa again! I also want your qualified opinion, as a dupe of the Educational Establishment, on Richard Mitchell's Less Than Words Can Say. Haven't been able to get you to read it yet, though.// I like the idea of an Isher summer camp for techie kids. Let's see, Space Camp is taken... how about "Time Camp?" Maybe a little too much like Tunnel in the Sky.

Barry-- I really do regret missing the 200 Elvis impersonators. Does anyone have a videotape?// What's a kneebiter?

Bonnie-- Hope softball treated you better than volleyball...// I'm sorry to hear that MSU's packaging majors are so dim. If the School of Packaging had higher academic standards, maybe boxes in this country would be easier to open.

Guy C.-- Speaking of the Third World, how do Spanish-speaking friends react when you tell them you've just bought a Ladyfriend?

Greg-- Hmm, another earthquake in San Diego this week. Mexico last year, San Salvador this year. Do you think the Big One is about due?// The L-5 folks may occasionally imagine themselves to be more important than they really are, but I've seen SF groups with the same problem. And L-5 really does have some effectiveness in Washington: they had measurable effect in getting Congressional support for the DoD Shuttle funds (paying for the new orbiter with \$2.4 billion in Defense money), the space station budget, and the Galileo probe. The group is singlehandedly responsible for killing the Moon Treaty, as far as I can tell.// Wow, I'd love to see the puppet Time for Beany. There's a very good account of it in Jim Harmon's The Great Television Heroes. I recommend all Harmon's books on radio and TV, by the way.// The secret of the F-19 stealth fighter is that the real contractor is Testor's, not Lockheed, and the plane is assembled from giant injection-molded styrene parts, which have almost no radar or IR cross-section.

Rod-- As somebody remarked, you really do need to have delimiters to keep your comments apart.// Like these.// Glad to hear the Amateur Space Telescope will be going up soon. Have you heard that the director of the Space Telescope Institute will be reserving a small amount of time for worthy proposals by amateur astronomers? He says it's in gratitude for the contributions amateurs have made to astronomy. Decent, very decent.// The Voyager aircraft is an audacious and admirable idea. Hope the round-the-world flight comes off okay!

#### Mailing Comments on Apa-Tech 43

Shal-- I have tried to noodge all the members I could find in Imminent Peril, though I must confess I stopped short of committing actual RPH (Ritual Public Humiliation). It seems such a cruel fate...

Laserdave-- I really wanted to see The Adventures of Mark Twain; it got great reviews around here. But it played for only one week, and that at only a few theatres. Guess I'll have to wait till the videotape comes out, then corner yuppie friends who are willing to watch Claymation. I drop everything when one of those Kentucky Fried Chicken commercials. Those are Will Vinton's, aren't they?

Rolf-- Hope you used your vacation to catch up on your reading! It's an opportunity the rest of us would beg for. Let us know when you're ready for a fresh "recommended books" list...

Rod-- Chris Cloutier has, for the past couple years, been creating and illustrating new game scenarios for Champions. In the course of this work he's become an expert on "home front" America during WWII.// Re aptitude tests: when I entered college I took something called a Strong Vocational Preference Test, if memory serves. It matched your answers with those of successful professionals in various fields (presumably satisfied, happy people), in order to see what professions you'd enjoy. It didn't claim to measure ability. My best matches were with Librarians and Computer Programmers, with Musician/Performers and Printers not far behind. Physicists were way down the list, maybe twelfth. My worst score, the only negative one, was with Forest Rangers-- where you did best. By the Transitive Property of Equality, that means you and I shouldn't enjoy each other's company.

Barry-- I agree that the deadwood members should get dropped, oldest first. And when I was deadwood, I was prepared to be dropped. That's what minac rules are for.

Crumbcrunchers-- Adults can go to Space Camp now, Susannah. I know a few who've been there. They tend to come back with tongues of flame over their heads-- very evangelical about the space program, trying to get everyone they know to go to Space Camp.// One of the typefaces I readily recognize is Microgramma Bold Extended, the font used in the General Technics logo and in all the headlines in the Old Pyro. One sees it everywhere. (Gerry Anderson's puppeteers were fond of it, too, and it shows up on a lot of their spaceships, submarines, etc.)// Solar power satellites are politically dead in this country, and they are too expensive to build unless you use extraterrestrial materials. I have heard that Japan, the USSR, and Europe have recently expressed a lot of interest in them, though.

Dave, you write, "The exploitation of space by business activities is the only hope for the human race maintaining a continuous and robust [presence] in space." It's not the only hope. What about large-scale military development of space? I agree that commercialization is a more desirable route. Nevertheless, there are plenty of space buffs who would be happy to ride into orbit on the coattails of the Space Patrol. Keith Henson has proposed starting a company to sell \$20 billion worth of asteroidal sandbags to the Pentagon, for armoring their vulnerable Star Wars satellites against attacks.// I didn't know all that interesting stuff about

PURPA. But surely power satellites would cost, not billions, but tens of billions of dollars, at least for the first few.// "Terrible ignorance" of space launchers & stuff? We can fix that! Just spend a weekend with Ruffa, and Leininger, and me (or some subset). You'll get educated-- if you can get us to talk only one at a time.

Greg-- Considering all the different professional conferences held in this country, you'd be extremely busy if you tried not to go to them all. Astronautics, astronomy, astrophysics, computer graphics... you'd be doing a heck of a lot of traveling! (Is this your chance to become a Gypsy Astronomer at last?)// You modestly failed to point this out, but Ruffa is by far the most frequently seen cover artist on Apa-Tech. And good covers they are, too! Minor correction: the ship on the cover of A-T 14 is intended to be the nameless ramship from Niven's A World out of Time. // Re your comment to Tim: "What would you like to do after you're discharged?" "Why, I'd like to charge right back up again, sir!"// I have a secret weapon to both the challenge of foreign technology and the sad failure of our schools to bring technical subjects to our people. The Soviet Union's schools are kicking out maybe two million graduates a year with X years of math, Y years of physics, Z years of English, and so forth. Why not hire 'em? What a tremendous manpower resource it would be to American industry!// Want to help me start the Old Astronauts Program?// Quit yer damn gloating about my reappearance in these pages, already!!

Let me know if Bruce Cordell comes anywhere near Chicago. I may find a place or two for him to evangelize.// Who's Irwin T. Lapeer?// Re beings from other worlds, a Notre Dame professor, Michael Crowe, has just done a book for Cambridge University Press on the subject of the extraterrestrial life debate from 1700 to 1900(!). Wish I could remember the title. It looks good, according to reviews and my bookstore skimming, but it costs sixty bucks. I'm gonna try to persuade some library around here to buy it.// Barry and I always liked Isaac Asimov's essay on the shift from Julian to Gregorian calendars. Certainly it has one of his best punchlines! Quick, Barry, which book is it in?// Last word on yellow diamonds (I hope!): I've seen WHO CARES WHO'S ON BOARD?// If you ask me, 1986 is uncomfortably late to be starting the replacement of a Shuttle fleet that's supposed to wear out in 2002. Maybe the current delay will extend the life a little...// One worrisome effect of SDI that I seldom see pointed out is that all the billions spent on it over seven or eight years will create its own lobby of laboratories and contractors which will (attempt to) be self-perpetuating. That is, organizations created as part of Star Wars will do their best to remain in being and continue getting funds. So the SDI effort itself will have created an establishment which will clamor for full deployment, independently of all the other parties to the debate.// "Name three 19th-Century British Prime Ministers." Disraeli, Gladstone, and, uh, Samsonite?

# AMORPHOUS ABSTRACTIONS

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This once a month apa is making me feel guilty. It's been 4 issues since my last contribution. A little guilt is what I need, though. I've been suffering from an absence of enthusiasm lately and guilt is a good way to get you going on something. This apa is one of a myriad of things which I am working on simultaneously so it usually slips until past the deadline.

One of the things I am working on now is the construction of a mercury mass driver. It started out to be a mercury fountain enclosed in a plastic dome Tullio gave me. I soon found out how much is involved in moving large volumes of mercury. It's dense stuff. The solution, I think, is to use I X B (force). A solid state pump. I've never been much good at mechanics anyway. One damper on my progress has been some apprehensiveness I've developed after an accidental mercury spill on my back porch. It was only 10 grams. That's enough to kill over a hundred people. Decontamination was expediently carried out, and left a number of my neighbors curious as to why I ran around in a yellow rubber suit on a sunny day. But they seem to wonder about everything I do.

I recently got a Yamaha DX-7 music synthesizer, based on a recommendation by Cap'n Al. The intent in this is to continue work on a project I've really been procrastinating on: my masters thesis on a digital music synthesizer. I've ordered a Mac Plus as a controller for the DX-7. I can't play the keyboard and don't intend to learn. Computers play well enough if they're taught how.

Speaking of Macintoshes, whenever a Mac owner upgrades to a Mac Plus, his motherboard, keyboard and disk drive get replaced. This has lead to a flood of these products on the surplus market. At least I'm told this. I've been looking for them for over a month now and have found very little. What I want to do is pack the motherboard, disk drive, a cheap switching supply, and a TTL monitor in a box. The box, power and monitor can be had for under \$70. Thus, in theory, I could start a small production run of Macs in the \$300 price range, depending on the cost of the surplus parts. The box could have enough room to insert a hard drive and a memory/SCSI port/ROM board, yielding a Mac Plus with hard drive for \$1200 - \$1400. If anyone knows the whereabouts of all these surplus Mac parts let me know.

In the rest of my spare time I'm learning Japanese, converting my Continental into a light assault vehicle, trying to fathom general relativity theory (part of phase two in the mercury fountain development), and working at my job less than I was before.

Things aren't going as well as they were at work. The problem is that ECD is going through lean times and came up with this new idea. Instead of having other companies pay us to do research, we could develop research we've already done and make products out of it. Looking about at what research was done revealed an



interesting prospect. Square foot solar panels are still too expensive to market, but it's just as easy to make arrays of thousands of tiny cells as it is to make one big cell. This is the basis of an optical imaging system that can scan an illuminated sheet of paper and digitally store the image from the page into a computer memory. From there the image can be put into a macpaint type program and altered, through a character recognition program to read the text on the page, or sent to a laser printer to be copied. This isn't as glamorous as designing three dimensional VLSI logic devices, but it certainly shows more potential for near term profits. I hate reality.

One good thing about skipping 3 contributions is that you have a lot of material to draw on for mailing comments.

Bill H. - I've read a lot about 16 - 18th century SF but haven't ever noticed any for sale. Do you own some? Do you loan out your books? I'm particularly interested in Lunar fantasy. I once based a Dungeons and Dragons campaign on what information I could find on this topic. Plenty of weird critters.

Bonnie - Amorphous materials are solids that don't have a predictable arrangement of atoms. In a perfect crystal, each atom is in it's place. in an amorphous solid, the atoms are jumbled together, forming an unpredictable mess. In crystalline semiconductor devices, like transistors, the behavior of the electrons is predictable, so you have an idea how the device will work. If the material is amorphous, it was thought that you couldn't get anything to happen because of all the unpredictable random bonds. If you study a jar of jelly beans for a very long time, though, you find that although they are randomly stacked, there are occasional regular patterns that connect with other occasional regular patterns. Statistically you can establish how much order there is and make predictions based on that. Sir Nevill Mott, a physicist from England, won the Nobel Prize for determining that amorphous materials can be semiconductors, just like crystalline silicon, if you take this statistical ordering effect into account. It's a very interesting academic curiosity and has led to such astounding achievements as the infamous Jello transistor.

No, I don't know Linda but...

Linda - I will possibly be flying to Japan sometime in the near future. My past two trips have been mostly devoted to business, leaving very little time to see all that I wanted. I hope my schedule won't be as hectic next time so I can take some vacation while I'm there. I don't know how I'll get around. I think I'd need a year of intensive training before I could drive a car there. Still, I may stop by to say hello.

Barry - How many comment hooks do you see in this one?

Bill L. - Omaha Nebraska is, of all major U.S. cities, perhaps the number one target for a nuclear strike. If I were an employee of Nine Minutes, I wouldn't want to work there. How are the phone links to Garden City, Kansas?

Bob - Fun Housewarming. In my spare time, ha, I'm trying to get involved in the bulletin boards in the Detroit area. I'll have





talk to you about them sometime.

Greg - It sounds like your group is shrinking at about the rate mine is. When I joined ECD it had 600 employees and now it's down to 300. Comforting.

Over 30 deaths a year occur due to blowfish poisoning. Nearly all of these are Blowfish enthusiasts taking extreme risks. As it was explained to me while the toxin was having its effect, the appeal can be addictive and leads to the desire for stronger doses. I'm not sure if my host actually bribed the chef (he's the type of guy who would), but there isn't supposed to be any noticeable toxin in the dish and mine had a bunch.

Roxanne - Secular Humanist Revival? ugh. I'm glad I missed that one. It's ridiculous to say creationism should have equal time with evolution, but just as ridiculous to remove all religious references from school texts. Both are attempts to misrepresent information to youth to promote a philosophy. Two things really bothered me about my state education; the righteous attitude toward the United States government that was conveyed, and the secular humanist history texts which went out of the way to avoid all references to religion except for the Egyptian Book of the Dead and a vision of Mohammed. Maybe that's why I'm anarchistic and have strong religious beliefs.

Rolf - I just got a copy of the Japanese Kanji ROMs for the Mac Plus. These allow you to switch between the all English Mac we're familiar with and one that prints English, Kanji, Katakana and Hiragana. If I get into mass production of cheap Mac Plus clones and include these ROMs, every member may fit your average description.

Donna - Is this enough margin? I have a problem with editing on my PC in that I've got too much software to get fluent in any one word processing package. Nearly everything I type is done on a different editor and I seldom get good enough to handle all the subtle details like margins. One of the woes of a software pirate. This contribution is being formatted with DWSCRIPT, the text formatting product IBM sells with it's mainframes. The manuals total 800 pages and I've read maybe 30 of them.



## TWENNY MINUTES OUTTA YER FUTURE

("It's hard to imagine that nothing at all  
could be so exciting, could be so much fun.")

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NOTICE: This zine is written  
in the official language of the State of California.

\* \* \*

Things haven't changed much since the last time I wrote. When I say this, I mean that the **second** time derivative is zero. I'm as busy as before; only the amount of time available to finish work is diminishing. I'm seeing the light at the end of the tunnel on the computations for my Mars paper. In about a week, we should be writing the manuscript with an eye toward being done in the first week of December. I'll be presenting it at a conference on electric propulsion in Colorado Springs next May (this time for **sure**), providing some department in the company comes up with the money to send me. I'm also writing a "trajectory design report" for our next three Atlas-Centaur launches, in which we are putting up Fleet Communications Satellites (called FLTSATCOMs); these are for the Navy, but the Air Force supervises the launches. In that document, I have to describe the work I did this year in finding the most fuel-efficient trajectory to the desired orbit (well, the computer did it -- but I **helped!**). This would have been out months ago if the Air Force hadn't kept changing their collective mind about **which** orbit they wanted and hadn't shuffled a couple of payloads around. Next, I have to write up results for simulations of a kludged-up rocket that I had analyzed back in March. It's supposed to put 100,000 pounds into a 150-nautical-mile-high orbit, but the original design barely managed 75,000. Based on a theory I came up with as to why the design was inadequate, that group came back with the same rocket with added solid rocket motors ("When in doubt, use more strap-ons!"). It turned out that **that** did the trick, but not for the reason I thought; so, of course, I now have a **new** theory... (But we can manage 170,000 pounds this time!) The reason for the rush is that I am leaving here on December 6th to go back East for some minor repair work and will be away until the New Year. So, after the first week of December, 1986 is over for me as far as work is concerned.

The Flight Mechanics group continues to shrivel: two more people left in the past month. (There's quite an ex-GD enclave forming at Martin Marietta, I understand.) If you don't count all the Systems Software people who were recently tacked on (who are almost as numerous as the rest of us), which was purely an administrative re-arrangement, we now have fewer people than we did a year ago, and that's **with** all the new kids. The next few months are somewhat uncertain. The government's decision on the Medium Launch Vehicle proposals is due in February. If we get orders for the new-style Atlas, all kinds of money will be pouring in; if not, there is a good deal of work coming in for us on Titan/Centaur, but not enough for **everybody**. Internally-funded research has been greatly reduced for next year, so I won't be heavily involved with Mars on a paid basis. We'll all either be incredibly busy and short-handed in four months or some more of us will be out walking around.

In any case, I am becoming less convinced that this is where the future is happening, as they say. Our big, exciting rocket to take us into the 1990s is a

slightly upgraded Atlas. We have just little bits of space station work and that's all hardware. We have all kinds of strange analytical work going on for future designs that it doesn't look like anyone will build in this century. We do essentially no development work on future forms of propulsion. I'd be surprised at this point if we were back on the Moon by 2000, much less anywhere else. I'll also be surprised if I'm still hanging around here by this time next year...

Meanwhile, we do have an Atlas/Centaur launch on November 21st, if all goes well. The same day, they're going to be re-arranging our seats in Flight Mechanics to get everyone in one part of the building. This is in aid of the remodelling of our building, which has advanced somewhat in the past couple months; they may get to our area within my lifetime...

As if this weren't enough, I have stupidly become involved in other stuff. I am still Publications Chairman and Newsletter Editor for the local section of AIAA until next June (I tried unloading half of that last June, when the Council changed over: not surprisingly, there were no takers...). I am putting together the December newsletter right now in my negative free time (for the past few weeks, I've been living in a "virtual state").

I have also been attending a number of the local events. The Aerospace Museum, together with our AIAA section, recently concluded a historical lecture series (see attachment -- don't you love the phrase "First Annual"?), which featured a number of the test pilots of some of the more exotic aircraft of the late Forties and the Fifties, such as the "Flying Wing," the "Flying Pogo Stick," and the Sea Dart. I got to meet one of the two surviving builders of the "Spirit of St. Louis"! (The other one is Douglas "Wrong-Way" Corrigan.) I'd like to repeat some of the anecdotes these folks told, but there's neither room nor time here. (General Cardenas has a wonderful photo, taken by a private photographer, of the Flying Wing approaching the U.S. Capitol Building. It seems President Truman wanted to see an example of all of our military aircraft in operation at that time, so the YB-49 was flown from what is now Edwards AFB to Washington, with some interesting and disturbing incidents along the way. Cardenas got to fly the Wing down Pennsylvania Avenue at an altitude of 800 feet (!), when the picture was taken. It has joined my collection of "alternate universe" images, along with the Hindenburg, swastikas and all, flying over Manhattan -- pictures of events that look like they occurred in some other time-line, but didn't!) A fellow at JPL, who has become a friend of mine, came down on October 23rd to an AIAA dinner meeting to talk about the Voyager-Uranus encounter (I wangled the invitation to him). He had some new photos I hadn't seen before and talked a bit about some of the newest theories on the planets and its moons and rings, including the likelihood that Uranus has a liquid water ocean and that Miranda looks so weird because it's been blasted apart and re-accreted five times. (He gave me his copy of the 4 July Science, which has the first wave of papers on the mission.) Neptune in thirty-three months! Sigma Xi, "the Scientific Research Society," is celebrating its centennial: the local chapter brought Kip Thorne down from Caltech to speak on gravitational waves. After an introduction to the theory, he talked about gravity wave detectors and the experiment they are constructing at either end of the U.S., the Laser Interferometric Gravitational Observatory (LIGO). It should have a sensitivity in the middle of the predicted range of output from various cosmic events; he predicts a revolution in astronomy, comparable to those brought about by the inceptions of optical and radio astronomy, around the turn of the century. I just went with a friend to Members' Night at the Aerospace Museum to see the new P-40 "Flying Tiger" on display; Walter Boyne, former Director of the Air and Space Museum was the special guest (we were wandering around looking at the exhibits and never did see him).

On the 12th, the San Diego Engineering Society, an "umbrella" organization of about 33 local chapters of various technical societies, is having a dinner meeting with a talk on the "nuclear accident" at Chernobyl. The speaker had attended the conference at Vienna and sounds like he may have some good "poop" on this. James Van Allen will be at UCSD to speak on "Forty Years of Space Physics" and will appear on a public panel on "The Future of Man in Space" (see another attachment). Our AIAA section also has a tour of the Supercomputer Center at UCSD coming up on December 5th.

There, I guess that shows that I can drop names just as well as Higgins can... It also shows why I haven't been home much the last couple weeks to finish important stuff like APA-TECH (sorry!). I expect things to cool off a bit in January.

Somehow feeling that I don't have enough to do, I have also begun looking into forming a chapter of the American Astronautical Society here in San Diego. I have been seen their "kit" and a list of known local members: there are only about twenty-five people, so it remains to be seen if this is worth the trouble. I've also begun a three-quarter course at UCSD on "Mathematical Methods in Physics and Engineering." I'm not sure I can do all the homework, but I think I may be learning something...

\* \* \*

## MAILING COMMENTS

### APA-TECH 43

(I'll get caught up on #44 next month...)

**Cover** . The flyer in the atrium you didn't see was, of course, the F-19 practicing high-g maneuvers...

**Dave** Yes, it is a swell title, once explained. Do my eyes deceive me, or are there **two** moons in that sky?  
I'm glad to hear that things are going better for you.

**Rolf** Your story of being required to take two months of paid vacation certainly illustrates the concept of "tanj," all right. I'm one of those ten-days-per-year people (I'm almost back up to three days accumulated now...).

**Barry** The stapling problem on #42 was a hardware problem: my normal-sized stapler just wasn't equal to the task. (It is also slowly wearing out -- I've sometimes had trouble getting it to fasten **ten** sheets.) I've just purchased a heavy-duty job that should take care of us into the Second Golden Age of AT, should something like it ever arrive...

"Vis vobiscum," indeed; "Ominous Nabisco" to you, too.

**Susannah** So much for my attempt to preserve your anonymity. I apologize if  
**& Dave** I misstated your opinion concerning members' participation in the APA under the new schedule. Happily, it's going better than either of us guessed it would. This APA always goes first-class ("But of course!"); certainly, under this chedule, transit time needs to be minimized. I've had bulk-mail stuff take from two days to two **weeks** just to get across town!

I am interested in your "word calendar" of Marlene's progress. How soon did she pick up the words she's **not** supposed to use? ("These &\$@% kids hear **every-**thing!!")

The "Terrible Twos" phenomenon is caused by the little-known fact that the

manufacturer only offers a two-year warranty on childrens' behavior...

I'm afraid I cannot enlighten you on details about the Shuttle main engines. I'm not an engineer (I don't even **dress** like one...) and do not have any contact with Rockwell; I doubt I'd follow much of what they told me if I did speak to them.

I've never been much taken with the idea of solar power satellites and I don't agree that **that** is the sort of thing that's holding back the commercial development of space (but I can only offer these remarks as my **opinions**). I don't even believe that we have a shortage of available energy on Earth yet: I believe we have a crisis of **wastage**. Many of our existing devices do not make as effective use of electrical power as they could. Moreover, the "American way of life" is far too casual about consumption and the use of electrification for an array of trivial tasks. The situation strikes me as similar to the world hunger problem: the Earth grows about enough food for everyone, but people invent a number of reasons to prevent some from getting their share. (Feel free to counter-punch me, by the way: this APA "thrives on controversy." \*ho ho\*)

Me            I am a firm believer in serendipity: I often find just what I'm looking for by opening up some book in a library at random or am haunted by repeated appearances of a particular name or concept in a short span of time. "It's like, uh, someone's tryna tell me somethin', ya know?" I did a literature search on scientific papers written on the moons of Mars since 1976 a month ago. I'm hunting down some of them at the UCSD Science and Engineering Library. A couple of them were presented at a symposium held at the U.S. Naval Observatory in Washington, D.C. on 11 August 1977. That night was the centennial of the discovery of Phobos and Deimos by Asaph Hall at that place; at 2:30 a.m., the participants went upstairs to look at those moons through the same 26-inch telescope, 100 years after their discovery to the minute. The reason I bring this up is that one of the papers I **wasn't** looking for ("I mean, like, I was lookin' for it, but I didn't know it, ya know?") was the one I have reproduced (without permission) by Owen Gingerich on the discovery of the moons, in which he also discusses why many people thought Mars had two moons before they'd ever **seen** them. I guess **they** were looking for them and didn't know it. Ya know?

\* \* \*

I had a visitor from the Midwest about a month ago. Rolf was staying for two weeks in one of the less interesting suburbs of Los Angeles and decided to come down over the intervening weekend. I kept him hopping about as much as I could manage. As soon as he got here Friday evening, we went to dinner at one of my favorite restaurants (it occurs to me I've taken all my visitors there) and then to the evening's production by the San Diego Gilbert & Sullivan Society. It was a locally-written musical play encapsulating the career of that duo, sprinkled with a number of songs from their various works. Rolf overheard someone in the lobby at intermission say, "You have to be a real Gilbert & Sullivan fan to like this." He seemed to like it... Saturday, we took our time getting started, but we did hit the obligatory record and used book stores. That night, we saw the new Flying Karamazov Brothers act, "Juggle and Hyde." It incorporates a lot of new material and significant extensions of their already considerable juggling skills. (It was the first time, however, that The Champ, Ivan, failed to meet The Challenge. The three objects were especially vicious, however: they were a large, eccentrically-weighted box, a rod with a lead weight hanging off one end and a stuffed glove stuck on the other, and a small, real, dead octopus. He almost succeeded on the third try, but took the pie-in-the-face like a man. What a sport!) The show gets two thumbs up from us. Sunday, we took in the Omnimax film on the Grand Canyon, then just sort of saw the sights around town. We also had time to talk and for me to show off the Amiga.

Have a good Thanksgiving! See you next month.





# American Institute of Aeronautics and Astronautics SAN DIEGO SECTION

1st ANNUAL

## HISTORICAL LECTURE SERIES

SAN DIEGO AEROSPACE MUSEUM - BALBOA PARK - 7:00 PM

**Sept. 25**

Thursday

### THE "WRONG WAY CORRIGAN" STORY

In 1938 Douglas Corrigan told U.S. officials that he was going to fly from New York to California, but 26 hours later he landed in Ireland. The Corrigan story will be told by noted San Diego photographer Howard Rozelle who recently interviewed Corrigan. Slides dating back to 1927 when Corrigan was a mechanic for Ryan Airlines building the Spirit of St. Louis will be shown. Corrigan's personal friend, Ed. Morrow, also a Spirit of St. Louis builder will be on hand to field questions.

**Oct. 1**

Wednesday

### THE YB-49 NORTHROP FLYING WING STORY

General Bob Cardenas, the Air Force Project Test Pilot on the Northrop flying wing will give us the inside story on this unique six engine jet bomber's flight characteristic and the politics that contributed to this airplane not entering production. A Northrop movie on the YB-49 will supplement the talk by General Cardenas.

**Oct. 9**

Thursday

### THE POGO STORY - A UNIQUE VTOL FIGHTER

J. F. "Skeets" Coleman, the only pilot to fly the Convair POGO Navy XFV-1 in vertical and horizontal flight will describe his experiences in tethered flight tests in the Moffett Field dirigible hanger and the full transition flights that he made from both Lindbergh Field and Brown Field in San Diego. Movies will supplement the talk.

**Oct. 16**

Thursday

### THE SEA DART STORY - OPEN OCEAN FLIGHT TESTS

B. J. "Jack" Long, Sea Dart Navy XF2Y-1 Engineering Test Pilot, will describe his experience in testing the single and twin ski Sea Darts in high sea state waters off the coast of San Diego. Movies supplement the talk. The Sea Dart at the entrance of the San Diego AeroSpace Museum is the one that Jack Long piloted in these hazardous tests.

**Oct. 30**

Thursday

### MEDICAL RESEARCH - HIGH SPEED ROCKET SLED

Col. John Stapp M.D., USAF (Ret) for a long time the fastest man on earth will describe his experiments using high speed rocket sleds for basic research in determining rapid deceleration effects on the human body. Col. Stapp rode the sled to near supersonic speeds subjecting himself many times to 50G deceleration forces. Col. Stapp founded the "Stapp Car Crash Conference" which in the last 30 years has made significant contributions to safer road vehicles.

**Nov. 6**

Thursday

### THE T. CLAUDE RYAN STORY "RYAN THE AVIATOR"

T. Claude Ryan was an early aviation pioneer in California. He established the first North-South airmail service with airplanes of his own design. He founded the Ryan Aeronautical Company building training planes during WWII and teaching many pilots through the Ryan School of Aeronautics. Based on the book, "Ryan The Aviator" by William Wagner, Bill Chana will present a series of slides covering the many activities of T. Claude Ryan.

AIAA Members - FREE to AIAA members who are also members of the San Diego Aerospace Museum. Non-members of the SDAM will pay \$3.00 per lecture, or they can pay \$15.00 for all five lectures and apply this to a SDAM membership.

AIAA Non-members - Pay an additional \$3.00 per lecture.



PUBLIC INFORMATION OFFICE, Q-036

LA JOLLA, CALIFORNIA 92093

October 17, 1986

From: Susan Pollock  
UCSD Public Information Office  
534-3120

## MARK YOUR CALENDAR!

The annual Marlar Lecture at the University of California, San Diego this year will feature noted solar and planetary physicist James Van Allen. In addition to the lecture, the UCSD Center for Astrophysics and Space Sciences has scheduled a special public forum, entitled "The Future of Man in Space." Van Allen, who also will participate in the forum, discovered the Van Allen radiation belts encircling the Earth, which led to a new understanding of cosmic radiation and its effect upon our planet.

Van Allen's lecture—"Forty Years of Space Physics"—will be held on November 18 at 4 p.m. in the Mandeville Center Recital Hall.

The public forum is scheduled for November 19 from 7:30 to 10 p.m. in Peterson Hall 108. Van Allen and other leading experts on space research and exploration will examine the pros and cons of sending people into space. Serving with Van Allen on the panel will be space chemist James Arnold, director of UC's California Space Institute and the Harold Urey Professor of Chemistry at UCSD; former NASA chief Thomas Paine; and Noel Hinners, director of NASA's Goddard Space Flight Center in Greenbelt, Md. William Nierenberg, director emeritus of Scripps Institution of Oceanography, will moderate.

Both events are sponsored by the William F. Marlar Foundation and are free to the public. More details will follow.

For more information, call Susan Pollock, Public Information Office, 534-3120.

## THE DISCOVERY OF THE SATELLITES OF MARS

Owen Gingerich

Harvard-Smithsonian Center for Astrophysics,  
Cambridge, Massachusetts

The planet Mars makes its appointed rounds from one close approach to the next in about two years and two months. At those favorable times of opposition the planet is a blazing ruby in the midnight sky, shining nearly ten times as brilliantly as its average light. But the oppositions themselves are not equal; owing to the eccentricity of its orbit, an opposition occurring on August 27 will bring the planet twice as close as one that occurs in February. Particularly favorable approaches occur every 15 or 17 years, and one of these took place a century ago, in September of 1877. In fact, it was the closest approach by Mars since 1845, and better than the favorable oppositions in 1860 and 1862.

Between the favorable opposition of 1862 and that of 1877, important progress had taken place in astronomical instrumentation. In 1862, the largest refractors were the twin 15-inch Mahler and Merz telescopes, one at Harvard College Observatory and the other at Pulkovo in Russia. Fifteen years later the recently installed Clark 26-inch refractor at the Naval Observatory in Washington, D. C., reigned as queen of the lenses.

This combination, a particularly close approach of Mars and the world's largest refractor, were essential ingredients in the successful discovery that we are commemorating today. But to say that this discovery was merely a routine piece of sharp-eyed observing under favorable conditions would underestimate the fundamental understanding brought to the problem by astronomer Asaph Hall.

Before filling in the circumstances of the detection of the Martian satellites in August of 1877, let me digress to the uncanny prehistory of the Martian moons. According to Jonathan Swift's *Gulliver's travels*, written almost exactly 150 years earlier, the scientists of *Laputa* had discovered two satellites revolving about Mars; "whereof the innermost is distant from the center of the primary planet exactly three of his diameters, and the outermost five, the former revolves in the space of ten hours, and the latter in twenty-one and a half; so that the squares of their periodical times, are very near in the same proportion with the cubes of their distance from the center of Mars; which evidently shews them to be governed by the same law of gravitation, that influences the other heavenly bodies."<sup>1</sup>

The most unsettling part of the prediction is the short, ten-hour period for the inner satellite -- considerably shorter than the 42 hours for Io, the fastest of the ten satellites known in Swift's day, and roughly approximating the eight-hour period that Phobos actually has. Table I compares the discovery data with Swift's predictions.

Table I

Mars' satellites	Actual		Swift's predictions	
	a/d <sub>M</sub>	P(hrs)	a/d <sub>M</sub>	P(hrs)
Phobos	1.4	7.6	3	10
Deimos	3.5	30.3	5	21 1/2

I hasten to add that it gives me certain satisfaction to say that Swift was not as clairvoyant as the first glance suggests. Table II gives a basis for guessing the distances of the satellites in terms of planetary diameters.

The choice of three and five planetary diameters for the distances of two satellites very nearly matches the corresponding distances for Jupiter's Io and Europa.<sup>2</sup>

Table I'

Jupiter	a/d.	P/(hrs)	Saturn	a/d.	P(hrs)
Io	3.0	42	Tethys (1684)	2.5	45
Europa	4.8	85	Dione (1684)	3.2	66
Ganymede	7.8	172	Rhea (1672)	4.5	108
Callisto	13.6	400	Titan (1655)	10.5	383
			Japetus (1671)	30.6	1900

More puzzling, however, is Swift's prediction of ten hours for the period of the first satellite. Even if Jupiter had been chosen as the model for satellite spacing, the periods would not follow by direct analogy. If Mars were as dense as the Earth, then the first satellite at three planetary diameters should revolve in roughly one day; if the density were more like that of a Jovian planet, the period should be closer to two days. A possible solution to this problem was pointed out to me by N. T. Roseveare of Chelsea College in London. Roseveare has noted a relevant passage in Newton's *Principia* that states "The smaller the planets are, they are, other things being equal, of so much greater density."<sup>3</sup> Now the diameter of Jupiter is about twenty-two times that of Mars, and if we take what now seems an absurdly high density for Mars, twenty-two times that of Jupiter, then the inner satellite should have a period of ten hours. Kepler's harmonic law was well known by 1726, and that Swift used it correctly should occasion little surprise, but all in all it appears likely that Swift had some professional help.

That Mars should have a pair of satellites was widely believed in Swift's day. After all, the Earth had one satellite, Jupiter four, and Saturn five, so by a rhythmic progression, Mars ought to have two. Voltaire expressed this line of reasoning in his *Micromégas* (1752), where he states, "[the voyagers] would see the two moons which belonged to this planet, and which have escaped the searches of our astronomers. I know quite well that P. Castel will write, and even rather pleasantly, against the existence of these two moons; but I am in agreement with those who reason by analogy. The best philosophers know how difficult it would be for Mars, which is next from the sun, to have less than two moons."<sup>4</sup>

Even earlier Fontenelle had mentioned the possible Martian satellites in his *Conversation on the Plurality of Worlds*. There the pupil argues, "Because Nature hath given so many Moons to Saturn and to Jupiter, it is a kind of proof that Mars cannot be in want of Moons."<sup>5</sup>

The inspiration for two Martian satellites may well have derived from Johannes Kepler, who repeatedly argued from archetypal principles based on harmony or analogy. In a letter to Galileo, Kepler wrote, "I am so far from disbelieving in the discovery of the four circumjovial planets, that I long for a telescope, to anticipate you, if possible, in discovering two round Mars (as the proportion seems to require), six or eight round Saturn, and perhaps one each round Mercury and Venus."<sup>6</sup>

A curious trap awaited Kepler because of his belief in the possibility of a pair of Martian satellites. Shortly after Galileo had published his *Sidereus nuncius*, he made yet another discovery that was announced to Kepler in an anagram. Kepler subsequently published them in the *Dioptrice*, his book on the theory of the telescope.<sup>7</sup> Kepler, who once published an anonymous work in which three different anagrams of his own name appeared on the title page,<sup>8</sup> promptly rose to the bait. He transposed the letters to read

Salve umbisteneum geminatur Martia proles.<sup>9</sup>  
Hail, twin companionship, children of Mars.

Kepler's ingenious but erroneous deciphering hinged on the word *umbisteneum*, apparently the Latinization of a German word *umbeistehn*.<sup>10</sup> In fact Galileo's anagram had nothing to do with the discovery of two satellites of Mars, but with the peculiarities of Saturn that we now understand to be its ring system.<sup>11</sup>

But let us now return to our centenary. Asaph Hall belonged to an old and once prosperous New England family. His early schooling was rather irreg-

ular, but eventually, hoping to become an architect, he enrolled in Central College in McGrawville, New York. There, according to the New York Tribune, students could meet part of their expenses by manual labor, something that appealed to the twenty-five-year-old Asaph, who had already for six years been a journeymen carpenter. In McGrawville he found a motley crowd of idealists and adventurers who cared little for a classical education. There, however, he met Chloe Angeline Stickney, a frail but determined suffragist, who taught mathematics while completing her own senior year. Hall was among her pupils, and she soon became his fiancée. After their marriage they went to the University of Michigan, where Hall began a study of astronomy. Firmly resolved to become an astronomer, he proceeded to Cambridge, where, in spite of Director George Bond's admonition that he would starve, he took a low-paid job at the Harvard College Observatory. A few years later he became an assistant at the U. S. Naval Observatory, where one of his early memorable experiences was playing host to an unexpected night time visit from President Abraham Lincoln.

In 1875 Hall was placed in charge of the still new twenty-six-inch Clark equatorial. His first discovery with this telescope, in December 1876, was a white spot on the planet Saturn, which he measured through more than sixty cycles, thus finding the first reliable period of Saturn's rotations since Herschel's determination in 1794.

At the time of the particularly favorable approach of Mars in August 1877, Hall undertook a systematic search for possible satellites. In the first section of his discovery monograph he described some of the circumstances, mentioning the thorough search made in 1867 by Prof. D'Arrest at the Copenhagen Observatory. Hall goes on to say "In his statement in the Astronomische Nachrichten, D'Arrest assumes a distance of Mars from the earth equal to 0.52, and with an assumed value of the mass of the planet in a given number of days. He shows that a satellite at an elongation of 70' would have a period greater than the period of Mars around the sun, or greater than 687 days, and hence infers that it is useless to search beyond the distance of 70'. The fact that D'Arrest, who was a skillful astronomer, had searched in vain was discouraging; but remembering the power and excellence of our glass, there seemed to be a little hope left."<sup>13</sup>

A decade later, Prof. E. C. Pickering sent the following query: "Is the rule thus assumed by D'Arrest of general application and correct? If so, it would serve as a guide in looking for additional satellites of other planets. Would a satellite placed at a greater distance from its planet continue under any circumstances to accompany the planet, or would it become an independent member of the system?... Presuming that you have had occasion to make yourself familiar with this subject, I take the liberty of asking whether you can conveniently give me the information above requested."<sup>14</sup>

In his response, Hall disclosed the theoretical background for his search:<sup>15</sup>

"In the Spring of 1877, when I began to think of searching for a satellite of Mars, a little rough calculation convinced me that this planet could have no moon even at half the distance D'Arrest assumes as a limit. [That is, 70']... The disturbing force of the sun on a satellite is the difference of its action on the planet and on the satellite...<sup>16</sup> Computing the forces by the expression  $\frac{u}{r^2}$ ,  $u$  being the mass of the sun, or of the planet, I found the disturbing force of the sun more than twice as great as the attraction of the planet on the satellite. Hence, we would at once reduce the elongation to 30', and this being a limit the probable elongation would be much less. A little trial, and the analogy of other planetary systems, led me to search very near the planet."

Later Hall wrote: "The chance of finding a satellite appeared to be very slight, so that I might have abandoned the search had it not been for the encouragement of my wife." Angeline Stickney Hall was an enthusiast, and Angelo, the third of the four Hall sons, claimed that she "insisted upon her husband's discovering the satellites of Mars." Hence there is indeed some justice that a large crater on Phobos has now been named "Stickney."<sup>17</sup>

Hall first glimpsed the object that was eventually named Deimos at 2:30 a.m. on the night of August 11-12. Figure 1 shows a section of the observing book for that date, and the none-too-legible writing says "Seeing good for Mars. The edge of the white spot has two notches near the center of its outline," and parenthetically "A faint star near Mars." Hall subsequently has added the note above: "This proves to be satellite 1."

## GREAT EQUATORIAL.

Date: 1877; Observer: H. A. J. 11

Time	Pos. Ang.	Time	Micro. I.	Micro. II.
Object: 9.4	11.100.1	9.4	11.100.1	4.1
R. d.	13	35	70.55	68.45
22 33.13			65.71	57.9
22 57.2			64.8	57.0
			3.63	1.74
	13	42	62.8	54.2
	13	41	70.452	68.363
			65.779	57.88
Object:	P. (alt.)		Mag. Power	Ad.
R. d.	13	41	70.452	68.363
22 33.13	14.10-15.15	22.13	68.45	68.45
41 15.10-15.15	14.10-15.15	22.13	68.45	68.45
42 14.10-15.15	14.10-15.15	22.13	68.45	68.45
43 14.10-15.15	14.10-15.15	22.13	68.45	68.45
44 14.10-15.15	14.10-15.15	22.13	68.45	68.45
45 14.10-15.15	14.10-15.15	22.13	68.45	68.45
46 14.10-15.15	14.10-15.15	22.13	68.45	68.45
47 14.10-15.15	14.10-15.15	22.13	68.45	68.45
48 14.10-15.15	14.10-15.15	22.13	68.45	68.45
49 14.10-15.15	14.10-15.15	22.13	68.45	68.45
50 14.10-15.15	14.10-15.15	22.13	68.45	68.45
51 14.10-15.15	14.10-15.15	22.13	68.45	68.45
52 14.10-15.15	14.10-15.15	22.13	68.45	68.45
53 14.10-15.15	14.10-15.15	22.13	68.45	68.45
54 14.10-15.15	14.10-15.15	22.13	68.45	68.45
55 14.10-15.15	14.10-15.15	22.13	68.45	68.45
56 14.10-15.15	14.10-15.15	22.13	68.45	68.45
57 14.10-15.15	14.10-15.15	22.13	68.45	68.45
58 14.10-15.15	14.10-15.15	22.13	68.45	68.45
59 14.10-15.15	14.10-15.15	22.13	68.45	68.45
60 14.10-15.15	14.10-15.15	22.13	68.45	68.45

The first observation of Deimos from the record book of the 26-inch refractor for 1877. Courtesy of U. S. Naval Observatory.

The following nights were cloudy and on August 15 the seeing conditions were very poor. On August 16 Hall's first observation was a rough measurement of "Star near Mars." On the following night the first page of the record book closes with the remark that "The Mars Star observed tonight is a fixed star and not the object observed last night." It is plain from this remark that Hall was already convinced that his object was a new satellite. Later that night he recorded for the first time two satellites, each ambiguously labeled "Mars Star."

The situation clearly changed by the following night, for Hall was joined in the dome by D. P. Todd, Simon Newcomb, and William Harkness, all of whom made measurements, and in the course of the observing the expression "Mars Star" becomes "Mars-Satellite." The first remark is in Hall's hand: "Images very poor at 9<sup>h</sup> 40<sup>m</sup>, but saw the satellite immediately." This is followed by four lines signed by D. P. Todd: "Seeing extremely bad: still I saw the companion without any difficulty. 'Halo' around the planet very bright, and the satellite was visible in this halo."

An interesting sidelight to the Mars satellites discovery was provided eleven years later in the same letter to E. C. Pickering that I have quoted previously. Hall wrote:

"In the case of the Mars satellites there was a practical difficulty of which I could not speak in an official Report. It was to get rid of my assistant. It was natural that I should wish to be alone; and by the greatest good luck Dr. Henry Draper invited him to Dobb's Ferry at the very nick of time. He could not have gone much farther than Baltimore when I had the first satellite nearly in hand."

The assistant Hall so much desired to get out of the way was none other than Edward S. Holden, a young protege of Simon Newcomb, and the man who later became the first director of Lick Observatory. Newcomb himself was in charge of the Nautical Almanac Office and, for all practical purposes, the scientific director of the Naval Observatory. Many years later, in a letter to Seth Chandler Hall described Holden's interest in possible Martian satellites:

## GREAT EQUATORIAL.

Date: 18 : Observer: H. A. J. 11

Time	Pos. Ang.	Time	Micro. I.	Micro. II.
Object: 9.4	11.100.1	9.4	11.100.1	4.1
R. d.	13	35	70.55	68.45
22 33.13			65.71	57.9
22 57.2			64.8	57.0
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	13	42	62.8	54.2
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22 33.13	14.10-15.15	22.13	68.45	68.45
41 15.10-15.15	14.10-15.15	22.13	68.45	68.45
42 14.10-15.15	14.10-15.15	22.13	68.45	68.45
43 14.10-15.15	14.10-15.15	22.13	68.45	68.45
44 14.10-15.15	14.10-15.15	22.13	68.45	68.45
45 14.10-15.15	14.10-15.15	22.13	68.45	68.45
46 14.10-15.15	14.10-15.15	22.13	68.45	68.45
47 14.10-15.15	14.10-15.15	22.13	68.45	68.45
48 14.10-15.15	14.10-15.15	22.13	68.45	68.45
49 14.10-15.15	14.10-15.15	22.13	68.45	68.45
50 14.10-15.15	14.10-15.15	22.13	68.45	68.45
51 14.10-15.15	14.10-15.15	22.13	68.45	68.45
52 14.10-15.15	14.10-15.15	22.13	68.45	68.45
53 14.10-15.15	14.10-15.15	22.13	68.45	68.45
54 14.10-15.15	14.10-15.15	22.13	68.45	68.45
55 14.10-15.15	14.10-15.15	22.13	68.45	68.45
56 14.10-15.15	14.10-15.15	22.13	68.45	68.45
57 14.10-15.15	14.10-15.15	22.13	68.45	68.45
58 14.10-15.15	14.10-15.15	22.13	68.45	68.45
59 14.10-15.15	14.10-15.15	22.13	68.45	68.45
60 14.10-15.15	14.10-15.15	22.13	68.45	68.45

"There are several points about the discovery of the satellites of Mars that have not been noticed. Thus Newcomb and Holden had the 26-inch Telescope for the first two years and they tried to make discoveries.... After two years Newcomb got tired of the night work and offered the instrument to me. He had made good determinations of the masses of Uranus and Neptune. Procyon had been examined very carefully for the disturbing companion. Of course one of the first things I did was to find out what my predecessors had been doing. I found in a drawer in the Equatorial room a lot of photographs of the planet Mars in 1875. From the handwriting of dates and notes probably Holden directed the photographer, but whoever did the pointing of the telescope had the satellites under his eyes. All that was needed was the right way of looking, and that was to get rid of the dazzling light of the planet. The satellites might have been found at Harvard in 1862 very easily.<sup>18</sup>

Hall's apprehensions that Holden would try to get into the act were promptly confirmed. On August 28 Holden wrote from Dobb's Ferry that he and Dr. Henry Draper had detected a third satellite of Mars on August 26 and 27, and a month later Holden claimed a fourth discovery, but both turned out to be as spurious as the canals observed elsewhere at the same opposition.

After Hall's death in 1907, his biographers lauded him as a great observer. Yet, as this episode attests, many of the greatest observations are spurred on by theory. Asaph Hall's discovery of the two satellites of Mars cannot be written off simply as the good luck of a keen observer who had the world's largest refractor at his command, for the record is firm both that his search was deliberate and guided by gravitational theory, and that others not so guided had failed in similar endeavors. It was, I think, appropriate to immortalize Angeline Hall nee Stickney on Phobos, but I am happy that Asaph Hall himself is even more prominently commemorated there.

#### FOOTNOTES

1. Jonathan Swift, Gulliver's Travels (London, 1726), part 3, ch. 3.
2. The two tables and Hall-Pickering correspondence were first published by me in Journal for the History of Astronomy i (1970), 109-115.
3. Issac Newton Mathematical Principles (F. Cajori, ed., Berkeley, 1934) Book III, Cor. IV, p. 417. As a justification Newton adds: "for so the powers of gravity on their several surfaces come nearer to equality."
4. Voltaire, Micromégas (1752), ch. 3. English translations usually say, incorrectly, "P. Castel has written," but as Dr. J. Veverka has pointed out to me, Voltaire was making a joke at the expense of the voluminous anti-Newtonian writer, Father Louis-Bertrand Castel (1688-1757).
5. Bernard le Bovier de Fontenelle, Entretiens sur la pluralité des mondes (1686); the quotation here is from p. 211 of an anonymous translation published in London in 1767, but an English translation by Glanvill was already available in 1702.
6. Quoted by Asaph Hall in Observations and orbits of the satellites of Mars (Washington, 1878) from David Brewster's "Life of Galileo", pp. 33-4 in Martyrs of science (London, 1874). The original quotation is from Kepler's Dissertatio cum nuncio sidereo -- see pp. 14 and 77 of Edward Rosen's Kepler's Conversations with Galileo's Sidereal messenger (New York, 1965).
7. Johannes Kepler, Dioptrice (Augsburg, 1611), 15. The second edition of Kepler's Dioptrice was published in London in 1653 along with Galileo's Siderius nuncius and a third edition appeared there in 1683. Hence Kepler's proposed Martian satellites were probably better known to the English audience than many of his other ideas.
8. Kanones Pueriles [= Joannes Keplerus] by Kleopas Herennins [= Johannes Keplerus] alias Phalaris von Nee-sek [= Johannes a Keplervs] (Ulm, 1620).



9. J. Kepler, Narratio de observatis quatuor Jouis satellitibus (Frankfurt, 1611), 3v; Johannes Kepler Gesammelte Werke, iv (Munich, 1940), 319.
10. Edward Stafford Carlos, The sidereal messenger, and a part of the Preface to Kepler's Dioptrice (London, 1880), 88.
11. In a letter dated 13 November 1610 Galileo transposed the anagram to read:  
Altissimum planetam tergeminum observavi.  
 "I have observed the most distant planet as a triplet."  
  
 Galileo's letter survives only in publication in Kepler's Dioptrice (Augsburg, 1611), 15-16; see F. Hammer's note in Johannes Kepler Gesammelte Werke, iv (Munich, 1941), 515.
12. For the biographical material on Asaph Hall I have closely followed my article in Dictionary of Scientific Biography vi (New York, 1972), 48-50.
13. A. Hall, Observations and Orbits of the Satellites of Mars (Washington, 1878), 1.
14. Pickering to Hall, February 10, 1888, Harvard University Archives UA V 630.14 vol. A7, p. 633.
15. Hall to Pickering, February 14, 1888. Harvard University Archives UA V 630.17.7; full text in Gingerich, loc. cit. 112.
16. Hall uses "action" and "force" loosely for acceleration. The disturbing force of the sun, using his numbers and setting the solar mass at unity, would be  $1/(1.5128806)^2 - 1/(1.5236914)^2 = 0.00618$ . The acceleration of the satellite at 70' (=0.0108 A.U.) by Mars would be  $3 \times 10^{-6} \times 0.132/(0.0108)^2 = 0.00339$  where the mass of Mars in terms of the earth's mass (0.132) is taken from Elias Loomis, A Treatise on Astronomy (New York, 1868). Hall's method is a little clumsily expressed, as he himself recognized, for he dashed off a second clarifying letter to Pickering the same day (published in Gingerich, loc. cit.); the formula in the second letter should apparently have had cubed, instead of squared, denominators. In thanking Hall for his letter on February 17, Pickering takes no notice of the error (Harvard University Archives UA V 630.14 vol. A 7, p. 670).
17. For an account, only slightly embroidered, of naming the crater "Stickney," see Carl Sagan, The Cosmic Connection (Garden City, N.Y., 1973), 105.
18. Quoted at slightly greater length in Gingerich, loc. cit. 113, with permission of the Hall family.

#### DISCUSSION

Question: In what way is Hall commemorated on the satellites of Mars?

Answer: The largest crater on Phobos is named Stickney. The second largest crater is named Hall.

## APPENDIX 2

## SUMMARY OF AFTER-DINNER SPEECH

In an entertaining after-dinner speech Brian Marsden explored further Jonathan Swift's tantalizingly accurate prediction of the satellites of Mars. Obviously, the only serious explanation for this could be that Swift was a Martian! This intriguing theory was espoused some years ago in a delightfully written article by Lyle Boyd (Harvard Repr. No. 710; originally in *Worlds of Tomorrow* for Feb. 1964), former publications editor for the Harvard College Observatory, and on this occasion it seemed appropriate to recall and amplify some of the evidence she had put forward. Swift's very birth, presumed to have taken place in Dublin in 1667, is surrounded by mystery, and his extended disappearance soon afterwards would have provided an ideal opportunity for a spirit transported from Mars to become acclimated to the terrestrial environment. Numerous instances illustrate that he never quite succeeded in his transformation, and both his physical appearance and his personality remained somewhat alien. There were two women in his life, and while some believe that he was married to one of them, this too is unclear. Perhaps it was no accident that both women had a name that meant "star", and in choosing to ally himself to a family "Swift", he was supplying an obvious clue to the fact that he had migrated rapidly to the earth from some distant location. Wasn't the elaborate and successful hoax Swift perpetrated on the astrologer Partridge simply an instance of one Martian showing superiority over another, just as, in ornithological terms, a swift is superior to a partridge?

There are Martians all around us (Marsden had never disguised the fact that he was a Martian himself!), and one of them, a Mr. Madan, persuaded Asaph Hall to adopt for the satellites of Mars the names Phobos and Deimos. The fact that Phobos and Deimos are mythologically the names of horses suggests that, like the houyhnhms in one of *Gulliver's Travels*, the superior beings on Mars are horses. The Martian satellites were originally stables, transported from the Martian surface with the help of magnets, in much the way the Laputians manoeuvred their travelling island. The stable satellites (although celestial machanicians still argue over whether the satellites are really stable!) then became the launching pads for interplanetary travellers, the mysterious grooves on Phobos being in fact runways along which the emigrating spirits took off in their flying horse troughs (a means of conveyance suggested by the title of Swift's first book, *A Tale of a Tub*). According to Lyle Boyd, Swift reached the earth unnoticed during the spectacular Leonid meteor shower in November 1666, fast on the heels of the associated but unobserved comet tempel, and while the comet catalogues mention that this comet was discovered by the German-born astronomer Wilhelm Tempel in 1866, one can ponder on the fact that when Swift moved from Ireland to England as a young man he went to live and work with Sir William Temple, the well-known statesman and writer who died when its 33-year period brought the comet back near the earth in 1699.

An alternative theory, advanced by Gerald Ouellette of M.I.T.'s Draper Laboratory, is simply that the satellites were discovered by James Bradley, later the Astronomer Royal, at the close approach of Mars to the earth in 1721. Not having been able to make enough observations to determine their orbits with any reliability, the cautious Bradley would never have mentioned his discovery in print, but at a cocktail party he might have made a remark to his friend the Bishop of Clogher, who was in turn a good friend of Jonathan Swift (having officiated at Swift's wedding, if Swift did in fact get married). Maybe Bradley did possess a telescope that could detect the satellites, for Asaph Hall used in his analysis of their orbits some observations by one Wentworth Erck, who claimed to see the satellites with a telescope of effective aperture only 4 1/2 inches. On the other hand, this alleged observer's name is suspiciously similar to the maiden name of Swift's mother (Erick), and one does not nowadays hear of observations of the satellites being made with anything smaller than a 10-inch telescope.

Anyway, whether Bradley discovered the satellites or Swift's provenance gave him prior knowledge of them, neither Bradley nor Swift supplied sufficient information for other astronomers to make observations. It was Asaph Hall who did that on the occasion whose centennial this Symposium was celebrating, and only he can in any sense be considered the discoverer.

